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THE CENTENARY PRODUCTION EFFORT.

THE EDITOR.

In the year 1829 two of the first important events in the history of Western Australia occurred. On the 2nd May of that year Captain Charles H. Freemantle hoisted the British flag at the mouth of the Swan River, and thereby proclaimed this part of the World's smallest continent—or largest island, as the fancy pleases—another addition to the Realm of His Most Gracious Majesty King George the Fourth of Great Britain and his dominions. One month later, exactly to the day, Captain James Stirling arrived as Lieut.-Governor, and formally established the Swan River Settlement, the foundation of Perth and Fremantle, and the beginning of a great and valuable asset to the United Kingdom.

Next year, therefore, the first centenary of our history will have run its course, and there is a very natural desire on the part of all our people to mark the occasion by some fitting celebration. Numerous laudable schemes have been proposed, many of which will, without doubt, be carried into effect; but of all such surely none can make a stronger appeal to public sympathy and support than that advocated by the Minister of Agriculture and his officers, *i.e.*, the accomplishment of a record year of agricultural, horticultural and pastoral production.

Of what use were it to add, as did Captain Freemantle, another territory to an already vast Empire if it were not only to be self-supporting, but a contributer to the many needed primary products of a great nation.

For long this part of the Australian Continent was disprized as a source of agricultural products. For the best part of a century it lay unheeded, except by a few sturdy pioneers; its capacity unconsidered, its magnificient timber resources unappreciated; regarded by the few who ever gave it a thought as a barren waterless waste, with perhaps a few oasis in widely scattered tracts. Then the lure of gold-bearing country called

to the adventurous and Western Australia awoke. Men followed farther and farther inland in search of the precious metal and hitherto unsuspected possibilities became probabilites. It needed railways, so they were built. It required harbours, and so they were constructed. The mad dream of pumping water 350 miles inland ceased to be a chimera, and took form and shape. The thing was done. But water was not everything, and the need of a greater food supply for an ever-increasing population was soon apparent, and so farmers timorously stretched out a little farther from the coast line, and finding it good wondered how far they might yet proceed. Then came the scientific farmer instructor gathering in from anywhere sheaves of past experience, groping round for rainfall records, matching various patterns of country side and experimenting with soils and seeds and fertilisers and climatic conditions, instructing, directing and supervising, and behold the demand for food was being met with the local supply. Wheat especially studied and cultured, one bright year was found to be over produced, and a market was sought elsewhere. Then people began to tell each other here was a source of wealth that only required development to replace the fast-declining gold yield. Now when people tell each other things they begin to believe them, and when they believe them they set to work to bring them about, and it soon happened that the wheat farmers of the State found themselves with a few million bushels of wheat to spare, and as the time went on production and surplus continued to increase, so that last year's harvest was more than double that of little more than a decade ago; that is to say that a production of 16,000,000 bushels in 1916-17 last year had become a production of 35,000,000 bushels.

But all these things were quite impossible until they happened, and the only excuse they had for happening was that the Government of the day and their advisers in the Departments of Agriculture and Lands, and the farmers and populace of the State wanted them to happen, and made up their minds to it. The suggestion then that the centenary production shall surpass all preceding years, and more, that it shall almost double the production of the 1927-8 harvest so far as wheat is concerned, and reach a higher mark than the present record of any State in the Commonwealth is no more impossible of realisation than those past achievements to which we have already alluded. Fulfilment requires but three things: faith, works, and a propitious season; the first two man can supply, the third is in the lap of the gods. At all events we should with normal fortune attain to the 50,000,000 bushels sought by the Minister for Agriculture, Mr. Millington, when inaugurating the Centenary Production Campaign at Yandanooka in April last. Mr. Millington said, "In asking for a production of 50,000,000 bushels in the centenary year the State was not asking for anything impossible. This year the area under crop for grain was 2 812,208 acres. Last year there was an increase in the acreage under crop of 400,000 acres, and the department felt justified in estimating that there would be an increase this year of at least 500,000 acres. If this were realised a slight speeding up of the normal rate of progression would give an increase of 700,000 acres to be sown for grain in the autumn of 1929, and that would give a total of 4,000,000 acres under crop for wheat. The estimated average yield for the State this year was 12.3 bushels to the acre. If 4,000,000 acres gave an average return of 12.5 bushels, the goal set by the department would be attained."

That the objective of the campaign is not designed to be a mere spectacular leap forward on an occasion, but has a much deeper significance, was emphasised by the Director of Agriculture, Mr. Geo. Sutton, at the same function when he said, "This campaign is not being launched with the object of securing some abnormal increase of production in the centenary year. The idea is that this special effort to stimulate production shall be taken in our stride, that, having achieved our objective in the centenary year, we shall continue to progress at the same rate—a rate that is the envy of the other States of Australia."

The effort to produce this year must follow somewhat on the lines of our crop competitions of the past, but will differ in this respect that where these were restricted to those ambitious farmers who desired by hard work, skill, and good methods, to win honour and a prize apart from material benefits to be received, the centenary effort must be unrestricted. Each farmer is part of a great scheme. He cannot stand aloof because of indifference. The State's success in this effort is his own ultimate welfare. His pride, his sense of personal honour, his obligation to the Government under which he holds his land, and to his fellow farmers who are exerting themselves to the utmost, must compel his responsive co-operation. He must not, through his neglect, allow the result to fall one bushel short of possible achievement; if he does he will earn the scorn of all those whom he has let down. It may not be open to him to achieve his highest aim, but it is open to him, and he must by his thought and his planning and his labour, *deserve* success.

The throwing open of an additional 1,000 blocks of wheat land by the Minister for Lands (Mr. Troy) is a good step towards the success of the campaign, but more will yet be needed, and the surveyor and his assistants, the clearer and the contractor are all involved in the effort and must be stirred to enthusiasm. In the farming districts there should be local committees to assist in stirring up a district pride and creating an agricultural conscience. Watchful eyes should see to it that there are no slackers in the neighbourhood, and bad and slovenly methods should be fought like a pestilence. Victoria and South Australia are out to increase their wheat yield, and it is up to the farmers here to take up the challenge and prove their worth. There could be no more wholesome or better competition than for each State to try and outdo its neighbour in production. It would give the greatest impetus the Commonwealth had ever felt. And these remarks do not apply to wheat alone, for every branch of industry is equally important to our nationhood, and there are many branches that require acceleration before our own demands for their products can be overtaken. Let the agricultural, the horticultural, and the pastoral industry then "Go to it."

"Four things greater than all things are—
Woman and horses and power and war."

We first earned the highest tribute paid to woman by the Commonwealth in the success of our first Miss Australia. Our horses have built up reputations seldom beaten and rarely approached. Our soldiery stands on the highest pinnacle of fame, and in the field of sport our footballers and our oarsmen have proved equal to the best opponents the sister States can put forward. Are we lacking in power? If so, it is well to remember the nation that produces most of what the world wants will always be the ruling power.

A REVIEW.

"Classing the Clip."

Under this title Messrs. Angus and Robertson Ltd., have published a Handbook on Wool-classing by Mr. Clarence E. Cowley, Lecturer in Charge of the Sheep and Wool Department, Technical College, Sydney. The object has been to produce a text book, couched in simple language likely to be of use to those whose business it is either grow or class wool. This aim has been achieved by reproducing in an attractive form the lectures given by the author during the Sheep and Wool Course at the Technical College.

A wide field is covered ranging from the structure of wool and of other animal and vegetable textile fibres to the handling, classing and pressing of the many different types of wool met with throughout Australia, and particularly in New South Wales. To us in Western Australia where fastening the rolled fleece is rarely, if ever, thought of, and never advocated, it is interesting to find instructions for those who still desire to fasten their rolled fleeces with a goose neck.

Though the widely varying conditions in this State may not permit us to have the same standardised lines as are shown in this text book, the method of presenting these by the author is of great value, particularly as a staple of each line advocated is splendidly illustrated, as are also staples representing the spinning qualities of the various types A matter of special interest to the commercial wool grower, large or small, will be found in the section dealing with yield, and which includes a table showing the estimated average yield of 80 types of wool.

The volume is a welcome addition to the literature on this subject, and of value to students and others interested in our major primary industry. As pointed out by the author in his introduction—"It is, of course, impossible to acquire a thorough knowledge of wool without much practical experience. Actual handling and working of wool is essential in order to develop those faculties which play such an important part in the determination of quality, besides developing skill and quick judgment, which readily distinguish a well-equipped and competent wool-man," but as also further pointed out—"Supplementary knowledge gained from a text-book has great possibilities when supported by practical experience and keen observation. These should develop sufficient capacity, at any rate, to materially assist in the production of the right type of wool, and in its effective preparation for market."

RED CLOVER

(Trifolium pratense Linn).

G. K. Baron-Hay, C. A. Gardner, and A. B. Adams.

Description.—Stock usually perennial, but varying from annual to perennial according to environment. Stems decumbent or nearly erect, one to two feet long, more or less hairy. Stipules rather large, ovate, veined, with long green points. Leaflets elliptical, obovate or obcordate usually on long petioles, almost entire. Flowers reddish-purple in large dense terminal avoid or globular heads with two sessile trifoliate leaves close to their base. Calyx tube obconical, villous, with four subulate hairy almost equal teeth, the fifth or lowest one about twice as long, the throat slightly narrowed internally by a hairy ring; standard exceeding the calyx, notched, wings and keel shorter. Fruit usually one-seeded, and differs from all other clovers except T. hybridum in the method of opening. The pod is a pyxidium which opens transversely, the lid breaking off with the base of the style attached, leaving a cup-like organ containing the seed which is thus easily shed.

The plant is native to Europe and Western Asia.

Red Clover is one of the oldest cultivated clovers, being known in Europe for over 400 years, and is included in most seed mixtures in those countries and in New Zealand. It has not been cultivated to any great extent in Western Australia but has become popular in the extreme South-West during the last three-four years, and the area sown should increase in the future.

Red Clover prefers a cool climate, and thrives best on deep alluvial loam soils. Good results have been obtained, both alone and in mixtures, on the well-drained Karri hills in the extreme South-West of the State, especially around Denmark. Poor results are obtained on light loams and sandy soils.

When sown alone, 6-8 lbs. of seed per acre should be applied, reducing this quantity to 2-3 lbs. when sown in pasture mixtures or with a cereal crop, such as oats.

Red Clover is a useful addition to pasture mixtures, owing to its rapid growth the first season, thus ensuring a good "bite," the more permanent pasture plants, *e.g.*, White Dutch, Paspalum dilatatum and Subterranean clover gradually replacing it in subsequent years.

Seeding should be carried out on a firm seed bed, burying the seed 1 to 1½ inches deep, in early autumn, *e.g.*, March-April, applying 1 cwt. of superphosphate per acre. The permanency of most pasture plants in this State depends on their ability to form seed.

In Europe and New Zealand, Red Clover is fertilised by the Bumble Bee, which is absent in this State. Some other insect or insects apparently can fertilise the florets however, as Red Clover forms seed in Western Australia, though sparsely.

Red Clover. (*Trifolium pratense*, Linn.)

Explanation of Plate.

A. Habit. B. and C. Flower. D. Fruit, showing cap which falls off to liberate seeds. E. Seeds. B., C., D., and E. enlarged.

Flower heads obtained from Denmark, Western Australia, in February 1928, with a fair setting of seed showed the following germination results:—

Germination	.. ..	7.5 per cent.
Hard Seeds	.. ..	89.0 „ „
Dead Seeds	.. ..	3.5 „ „
		100.0

Probably due in a large measure to the paucity of seed production and also to the dry summer, Red Clover seldom lasts more than two years in a pasture in Western Australia, especially if heavily grazed. It is very drought resistant, and will remain green during the summer in districts such as Denmark and Manjimup, and rapidly grows should a summer rain be obtained.

Red Clover may be cut for hay, but it is most important to cut the crop before seed production takes place. Cutting when the majority of plants are in full bloom is recommended, as the indigestible fibre rapidly increases after this period.

Properly cured Red Clover hay, with the leaf, is greatly appreciated by all stock, and is specially valuable to milch cattle. Where it is desired to grow Red Clover for green soiling or hay making the following method of management is worth a trial. Sow the clover seed with an oat crop, using 1½-2 bushels of oats and 8-10 lbs. of Red Clover seed. Fertilise with 180 lbs. superphosphate per acre.

The Oat crop may be cut for hay in the spring, while the clover will continue to grow and may be cut as green fodder for hay at a later date. The clover may be grazed lightly during the following winter, and may be cut for hay in early summer as in the previous year. Grazing should be very light during the summer months. The aim should be to cut for hay or green material, when at the correct stage of growth, rather than feeding off, if grown by this method.

Grown in this manner Red Clover will be found a good substitute for lucerne, which is rather difficult to establish on new country in the extreme South-West of the State.

"PHOSPHATE" OR "PHOSPHORIC ACID."

GEO. L. SUTTON,
Director of Agriculture.

In order that farmers may know the relative agricultural values of the different brands of superphosphate and other phosphatic manures which are offered for sale, the vendors in Western Australia and some of the other States are required to state and to guarantee the percentage of "Phosphoric Acid" (P_2O_5) which, respectively, they contain, and which determines the value of the fertiliser. In South Australia the vendors for the same reason are required to give the same information, but in that State the essential particulars are stated in another form, and the fertilising constituents are guaranteed as "Phosphate."

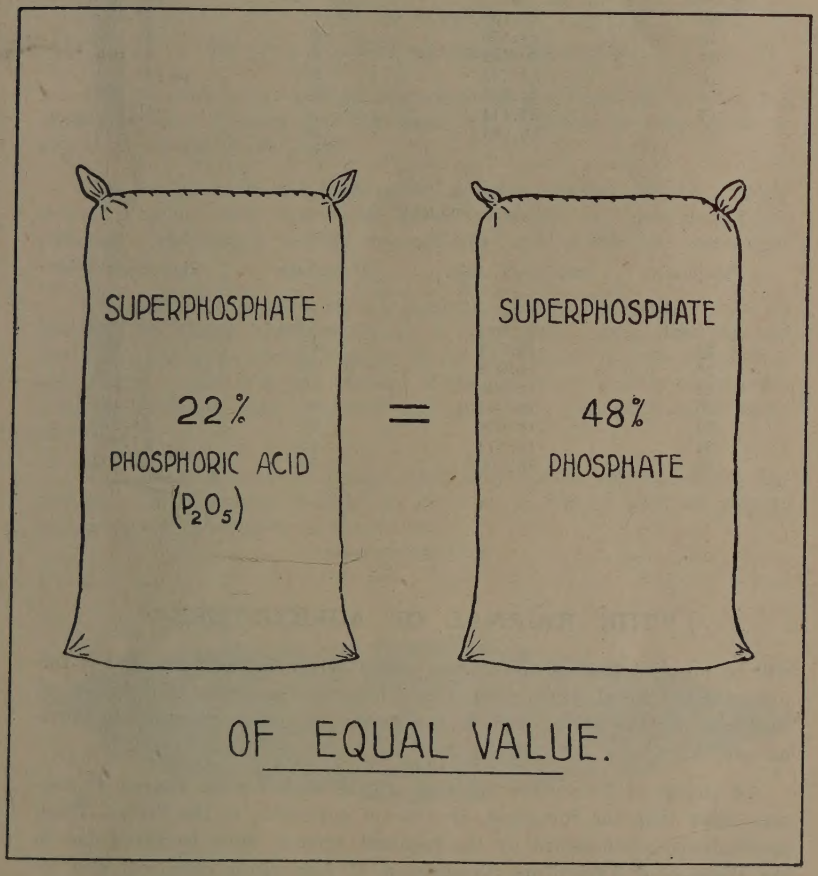
To the layman these terms have a certain similarity, but they differ widely in their value for comparative purposes, and in consequence their use is confusing to those not familiar with their relative chemical values. Without some knowledge on this latter point it is impossible to compare two phosphatic fertilisers of the same type, one of which has its contents expressed as "Phosphoric Acid," and the other its contents expressed as "Phosphate." For comparative purposes in assessing the value of phosphatic fertilisers, it may be stated that "Phosphoric Acid" has approximately 2⅕ times the value of "Phosphate."

In the fertiliser trade the term "Phosphate" is conventionally understood to mean Tri-calcic Phosphate of Lime. This is a compound of "Phosphoric Acid" in which there are three parts of Lime united with one of "Phosphoric Acid." It is obvious, therefore, that "Phosphate" is greater and heavier than "Phosphoric Acid," and in consequence the number expressing the fertilising value of superphosphate or other phosphatic manure as "Phosphate" will be greater than if the contents be expressed as "Phosphoric Acid."

Having regard to the molecular weight of "Phosphate" and "Phosphoric Acid" it is found that a unit of "Phosphoric Acid" may be represented by 142, and a unit of "Phosphate" by 310, *i.e.*, by an additional 168, which is the molecular weight of the three units of Lime which are united with the "Phosphoric Acid" to make the compound conventionally called "Phosphate."

The relative weights of "Phosphate" and "Phosphoric Acid" are, therefore, 310 and 142, or 2.18 and 1, so that superphosphate guaranteed to contain respectively 2.18 per cent. of "Phosphate" and 1 per cent. "Phosphoric Acid" would have the same value. It is, therefore, obvious that in the case of a phosphatic fertiliser, in which the plant food is expressed as "Phosphate." it will be necessary to divide the percentage of phosphate by 2.18 (roughly 2⅕) in order to compare it with a similar fertiliser in which the plant food is expressed as "Phosphoric Acid," thus a superphosphate guaranteed 45 per cent. "Phosphate" has less value than one guaranteed to contain 21 per cent. "Phosphoric Acid."

To those not familiar with the relative values of the terms "Phosphate" and "Phosphoric Acid" the agricultural value of a fertiliser with its contents expressed as "Phosphate" may appear of greater value than a similar fertiliser with its contents expressed as "Phosphoric Acid," though actually



its value may be less. In the same way to one not acquainted with the fact that the Australian wheat sack holds slightly more than three bushels, one farmer's production of 3,000 bushels may appear greater than another's production of 1,100 bags.

In the following tables are shown the relative equivalent percentages of "Phosphate" and "Phosphoric Acid" (P_2O_5) over a limited range:—

TABLE A.

Phosphoric Acid.	Phosphate.	Phosphoric Acid.	Phosphate.
per cent.	per cent.	per cent.	per cent.
12	26.196	19	41.477
13	28.379	20	43.660
14	30.562	21	45.843
15	32.745	22	48.026
16	34.928	23	50.209
17	37.111	24	52.392
18	39.294	25	54.575

TABLE B.

Phosphate.	Phosphoric Acid.	Phosphate.	Phosphoric Acid.
per cent.	per cent.	per cent.	per cent.
24	10.993	38	17.406
26	11.909	40	18.322
28	12.825	42	19.238
30	13.741	44	20.154
32	14.658	46	21.070
34	15.574	48	21.987
36	16.490	50	22.903

"THE JOURNAL OF AGRICULTURE"

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Editors of agricultural and country papers are invited to reproduce any of the articles contained in this *Journal*, providing the usual acknowledgment is made.

If you are not receiving the *Journal*, which is issued quarterly, and wish to do so, please forward your name and postal address to the Director of Agriculture, Perth.

LEAF RUST OF STONE FRUITS.

(*Puccinia pruni-spinosae.*)

W. M. Carne,
Economic Botanist and Plant Pathologist.

Though Rust is of common occurrence on the leaves of peaches and nectarines, from January until the leaves fall, it cannot be regarded as an important disease in this State.

The leaves of almonds and plums are also affected, but to a lesser extent. Peaches which ripen very late in the season may have their fruits attacked. This occurs usually on seedlings, and is rare on commercial varieties.

The effect of Rust is to cause a premature fall of the leaves. With us, however, the disease becomes plentiful so late in the season that the leaf fall is too late to do serious damage to the buds which produce the flowers and growth of the following spring. Normally the disease is not marked until the fruit has been gathered and the buds well advanced towards maturity.

With humid summer conditions, Rust may become general earlier, but with our normal summer weather its incidence is delayed until the coming of more humid conditions in the autumn.

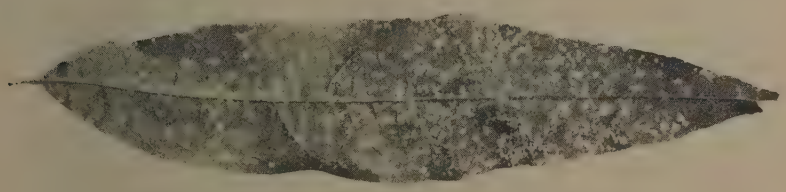

Plate I.

Upper surface of Peach Leaf showing yellow spotting due to Rust.

(Photo. N.S.W. Dept. Agric.)

Affected leaves may be recognised by more or less numerous yellow spots on the upper surface (Plate 1). On the under side and corresponding with these yellow spots, pustules are developed, which burst and expose

dusty masses of minute rust—coloured spores (Plate 2). The spores (fungal seed-bodies) are the means by which the causal fungus is blown by the wind from leaf to leaf, or tree to tree, each being a potential source of infection.

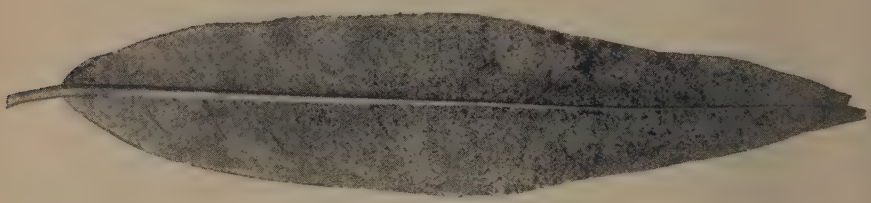

PLATE II.

Under surface of Peach Leaf showing Rust pustules.

(Photo. N.S.W. Dept. Agric.)

The lower and older leaves first show signs of the disease, turn yellow and fall prematurely, leaving the upper and younger leaves at the end of the branches.

Peach fruits attacked by Rust become rough and scabby or spotted.

Although the premature loss of leaves must have some effect on the trees, there is not sufficient evidence of damage caused by Rust in this State to justify the adoption of any specific control measures.

At the same time, such routine practices as the burning of prunings and the ploughing under of the fallen leaves in the early spring should help to check the disease. Further, the use of a general purpose spray such as lime-sulphur, 1 gallon to 10 gallons water, applied before the buds swell, will assist to control Rust as well as the more serious Leaf Curl and Scale Insects, and will keep the trees free from lichens and algae.

THE BLOW-FLY MENACE.

H. McCallum,
Sheep and Wool Inspector.

The mortality amongst sheep from attacks of the Blow-fly is far more serious than the sheep farmers are aware; individually they are doing their best to eradicate this pest, but unless some general action is taken it may prove, sooner or later, to be a great danger to the pastoral industry.

In other countries it has been proved that the mortality amongst sheep through attack by the maggot fly is on the increase. Every country where sheep are bred has this pest in some form or other. With the increase of wool grown on each animal during the past few years there has been an accompanying increase in yolk and foreign matter, and these have proved a natural attraction for the fly.

When one comes to consider the history of the fly and that every maggot hatched will, if not destroyed, mean hundreds more in due course, it will be seen that it is an undertaking that means a lot of hard work for the sheep farmer. Fortunately at this time of the year the length of wool is not great and so the attraction is reduced, but all the same, there are sheep that are liable to be struck; therefore every good sheep man should crutch his sheep.

The loss in value of wool from sheep that have been struck by the fly is enormous, and this alone is sufficient incentive for the sheep-owner to vigorously combat the pest. The amount of wool that is taken from sheep by crutching every year alone runs into big money and though the wool in many cases may not be trimmed off it has, after treatment for the fly, a low value on account of being discoloured and only fit to put in with the lowest grades.

Every insect instinctively does its best for its young and the fly, therefore, seeks a place that will not only give security for its eggs but also provide food for the maggots when hatched.

When the seasonal green feed comes forth sheep are inclined to gorge and so cause a certain amount of scouring, and the state of their hindquarters is a great attraction for the fly to lay her eggs, but it is not only the hindquarters of the animal that the fly will strike, for in the folds on the neck and even about the head maggots are often found. Some sheep, whether it is that they issue forth an attractive kind of yolk or have some other peculiarity, are more prone to attack, and these should be always marked for future examination and eventual disposal for they are of little value to the flock owner.

The carcases of dead animals should be quickly disposed of, preferably by burning, but if no facilities for this are handy by burying deeply. This does away with one great breeding ground.

When sheep are slaughtered for food the entrails and other parts are often left lying where the animal is killed and quickly form a breeding spot. Then again the sheep skin often is neglected instead of being stretched out and decomposition sets in the overlapping parts, soon attracting the fly.

Rigid farm sanitation will greatly facilitate the eradication of the fly, and it is imperative that the farmer should attend to all details so simple and yet so necessary. The foregoing constitute but some of the causes for the attack on the sheep and are the ones which can be easily remedied. Others which are harder to combat also play their part. Temperature and humidity are big factors, and after rain or a heavy thunderstorm, when the air is muggy, the fly becomes very active and will strike a sheep on almost any part of the body. This is the time when the flock itself wants careful watching. Rams when being mated with the ewes, require to be well inspected and in many cases it will be found necessary to trim them. It is always safer to do this before mating them to the ewes, as a ram struck and carrying maggots in his wool is very apt to convey them to the ewe when serving. To ensure a good lambing it is absolutely essential that the rams and ewes should be clean and healthy at the time of mating.

Signs of a "Strike".—Without yarding the flock it is an easy matter to tell when sheep are struck by just standing off and watching them for a short time. Here and there they will be seen rubbing themselves in the same way as they do for lice; stamping; trying to reach their hind-quarters with their mouths; and, in the case of rams struck on the belly, trying to scratch themselves with their hoofs. The animals struck should be carefully examined all over and at the part where the maggots are found the wool will be wet and discoloured. In many cases the maggots will not be visible if the staple is long, but on opening up the wool to the skin they will easily be seen and on clipping the wool away a raw patch will be revealed where the maggots have been eating into the skin.

This is the cause of the unrest in the sheep. The injured parts should be carefully treated and they will soon heal.

Treatment and Prevention.—For killing the fly and maggots there are many useful preparations sold by the leading stock firms and every farmer should have some on hand, and treat affected animals as soon as possible after their being struck. This will greatly minimise losses, but of course, will not exterminate the pest. Dipping at the correct time goes a long way to check the fly, as the wool so treated contains a certain amount of poisonous substance and is unattractive to the parent fly. If well fed and provided with a good lick to purify the blood the sheep will lose their attraction to the fly and the percentage of attacks will be greatly reduced. The use of fly traps and poison around watering places, sheep yards and killing pens will also prove invaluable in combating this pest. It is only by a systematic attack at the root of this trouble—the breeding places—that the possibilities for the spread of the fly can be eliminated. As with all other things, prevention is better than cure, and prevention in this case can only be effected by the united effort on the part of all farmers to see that all possible breeding places are destroyed.

EXPERIMENTS ON THE FERTILISATION OF THE EGG OF THE QUEEN BEE.

H. Willoughby Lance,
Apiculturist.

There is one item of the economy of the hive that is always of interest to beekeepers and scientists. That is the laying by the queen of female eggs in worker cells and of male eggs in drone cells. The popular theory for many years has been that it is not a question of selection by the queen, but that it is due to the physical properties of the queen and the size of the cells. The theory was, that owing to the small size of the worker cells, when the queen inserted her abdomen into the cell for the purpose of depositing the egg the edge of the cell pressed on the under portion of her abdomen, causing the sperm duct to open and fertilise the egg as it passed through the oviduct. In the case of drone cells, the cell being larger the abdomen was not pressed by the edge of the cell and the sperm duct did not open, so that the egg passed through unfertilised and produced a male.

Experiments made by O. R. Jordan of Bohemia, and reported in the "Bee World," distinctly proves the above theory erroneous. In one experiment a young queen was put on a comb consisting entirely of drone cells, in an observatory hive. The queen ran around the comb looking for worker cells; not finding any, she laid in the drone cells, and in due time these eggs hatched out and everyone of them brought forth a worker. The experiment was repeated with a one-year old queen with the same result. Mr. Jordan made very elaborate measurements of worker and drone cells, and intermediate cells often built at junction of worker and drone comb, also of queens with three different types of bodies. Old and new combs were measured, and it was found that the largest worker cells were larger than the smallest drone cells. If the pressure theory were correct, it would mean that out of the larger worker cells only drones could proceed, and out of the smaller drone cells only workers, which would lead to a change in the use of the cells as they became older. Comparisons were made between the various queens by means of diagrams which would show that a large queen could not avoid pressure in a small drone cell, and therefore could only lay fertilised eggs; a small queen, on the other hand, laying in large worker cells would only lay unfertilised eggs; but neither the one nor the other case occurs.

The experiments were very elaborate and extended over three years. One very interesting observation was made last year; Mr. Jordan possessed

three combs on which, as rarely happens, the change from worker to drone cells was quite gradual. The centre was composed of worker cells; next there was a band of cells of increasing size, and on the outside, drone cells. One of these combs was put into a strong stock next to the outside comb. The first and second batches of brood were workers up to the drone cells; that is the intermediate cells had worker brood in them. In the third batch drones were reared almost up to the worker cells. That meant the intermediate cells were twice used for worker brood and once for drone.

This experiment seems very valuable as it proved that the queen had the power of laying fertilised or unfertilised eggs at will. What actually influences the insemination of the egg has not yet been discovered. The experiments would go to prove that the queen knowingly participates in the insemination and also instinctively knows that fertilised eggs should go into worker cells, and finding only drone cells is confused, and cannot understand why the bees have only built drone cells. Knowing, however, that she requires workers to build up the colony she lays worker eggs in the cells provided.

In what manner the queen is able to discriminate between male and female eggs may not be discovered, but the pressure theory is certainly discounted by the above experiments.

NITROGEN FIXATION AND AGRICULTURE.

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To the student of economics there are many signs that the question of raw materials for food and industry will profoundly affect, if not dominate international relationships, and the question of their supply is not an entirely economic one. Its ramifications penetrate into the spheres of human activity including those of science and its application. Chemistry, physics, physiology, botany and entomology all play their part in alleviating the consequences of Nature's somewhat haphazard distribution of the necessaries of life and progress.

From chemistry and physics we may expect most, for are they not showing us every day how to satisfy our primary needs by fabricating the raw materials of food, clothing and shelter from such simple materials as air, water, fuel and vegetation.

Of all man's basic needs food is the most important, and as man ever tends to multiply beyond his means of subsistence the old problem of food supply still awaits its solution, for as land suitable for agriculture is limited and its fertility gradually declining, the fertility must not only be restored but also increased to meet mankind's ever growing needs.

Civilisation through the health authority has made us abandon the economic practice of returning to the soil the unassimilated plant nutrients of our food (a practice followed by Germany during the war and by China from time immemorial), and as other organic manures are strictly limited in amount the only solution of this fertility problem, in which nitrogen plays a great part, is to manufacture our fertilisers from natural products. Apart from the Chilian nitrate deposits, which have a definitely limited life, and the wonder workings of the nitrogen-fixing bacteria in soils, the world is ill supplied with natural nitrogenous fertilisers. However, the chief raw material of these fertilisers—nitrogen—is itself extremely abundant in the atmosphere. Few human achievements can compare in importance with the recent work of the physical chemists and engineers in making this mine of potential fertility available for agricultural and other purposes. Of all the material factors which have helped to make the war the greatest and most devastating conflict in human history the possession by Germany of adequate plant for making synthetic ammonia by utilising atmospheric nitrogen, and of adequate personnel for operating it, was probably the most important.

The Sources of Supply of Combined Nitrogen.—Until comparatively recent times the principal sources of supply of combined nitrogen for fertilisers have been:—

(1) By-product sulphate of ammonia derived from the coal gas and coke industries; and

(2) The Chilian nitrate deposits (natural crude nitrate of soda, or "caliche").

As these two not inexhaustible sources of supply formed the bulk, the time had not seemed far distant when a world famine of fixed nitrogen would be in sight.

Modern chemical and engineering science has solved the problem of sufficient and cheap fixed nitrogen, and to-day we are able to draw on the almost inexhaustible supplies of atmospheric nitrogen for agricultural and other industrial purposes.

Nitrogen is an essential plant food.—Plant life is unable to directly assimilate free nitrogen from the air. It takes it in generally in the form of soluble inorganic nitrogenous materials from the soil solution. But occasionally it derives its nitrogen supply from products of nitrogen-fixing bacteria living symbiotically with certain specialised types of plants.

Air, a substance of great weight.—The ultimate source of nitrogen is the atmosphere which holds inexhaustible supplies, and the introduction of this new industry leads one to realise that air is not only a substance of importance to industry but is a material of enormous weight. If we say a cubic foot of air weighs 1¼ ozs. it does not sound much but it means a cubic yard weighs 2lbs. 2ozs. and a cubic mile of air over 5,000,000 tons. The whole atmosphere has been calculated to contain 4,000 billion tons of nitrogen. This enables one to realise the enormous weight of air resting on a country and the still greater weight amounting to many millions of million tons resting on the seas around such countries. All the air is free and anyone can draw on it. The supplies are practically unlimited, no matter how many millions of tons may be required for manufacturing processes in the future. The fact of the atmospheric circulation makes it continuously available at the plant, an economic advantage rendering costs of transport *nil*.

The atmospheric nitrogen-fixation industry has thus certain features which appear to give it the assurance of permanence and of very great future development. The raw materials with which it deals are cheap and plentiful and are common to all countries. No country is therefore able to obtain a monopoly except through its superior scientific knowledge and commercial ability. The main raw materials required are air, water, limestone and gypsum together with power which may be derived from fuel or water.

The synthetic production of ammonia now contributes about 75 per cent. of the world's supply of fixed nitrogen, and the industry is expanding at the rate of 100,000 tons of fixed nitrogen per year. Approximately 800,000 tons of fixed nitrogen is the present year's output forecast.

The marketable products of nitrogen fixation.—The fixation of nitrogen, whether by the arc, cyanamide or the ammonia processes, is generally only a first stage in the production of a marketable product. The nitric acid of the arc process is ordinarily converted into calcium nitrate or into ammonium nitrate by interaction with ammonia. Much of the cyanamide manufactured is converted into ammonia by digesting with dilute alkaline solution in high pressure autoclaves and the ammonia in turn being converted into sulphate or phosphate, or oxidised into nitric acid and so converted into nitrates.

Urea is also a product from commercial cyanamide. This latter is converted into free cyanamide by the action of CO_2 or other acids and the solution so obtained is transformed into urea by the action of dilute mineral acid.

Synthetic ammonia is converted into ammonium sulphate by interaction with sulphuric acid, or latterly by the gypsum process in use in Germany and England in which to a suspension of gypsum in a stirring apparatus sufficient ammonia and carbon dioxide are added to form sulphate of ammonia and carbonate of calcium. The latter is separated by filtration and used in the preparation of nitrate of calcium with the recovery of the carbon dioxide in the process.

There has recently been also a remarkable development in the conversion of synthetic ammonia into urea commenced by Germany in 1924. Ammonium carbonate is first produced by interaction of ammonia and carbon dioxide, and this is then transformed into urea by heating in an autoclave at 160°C. and 60 atmospheres pressure.

A commercial process for oxidising synthetic ammonia into nitric acid, a raw material for explosives and fertilisers as exemplified in the Ostwald oxidation process, has been successfully achieved and is normally carried out in conjunction with the Haber synthetic process. This oxidation process consists of the burning of ammonia in air under suitable conditions of temperature and in the presence of a catalyst and optimum gas velocity and the absorption in water of the acid produced.

In 1919 Germany recognised that nitrogen in ammonium compounds could not completely replace in agriculture nitrogen in nitrate compounds as in Chilian product, so to compete with it Germany produced synthetic nitrates of the same nitrogen content. Thus the marvellous growth of the nitrogen-fixation industry has excited those interested in the production of Chilian nitrate, the consumption of which has not advanced *pari-passu* with that of the artificial product, and it appears only a question of time for synthetic products to hold undisputed sway. The cost of producing synthetic nitrates is less than the cost of mining, concentrating and exporting the natural deposits in Chili. At present the amount of ammonia oxidised to nitric acid is a comparatively small proportion of the whole output of synthetic ammonia as the ammonium fertilisers still tend to be cheaper than the nitrate fertilisers.

Most of the fertilisers prepared from synthetic ammonia contain a higher percentage of nitrogen than any of the materials prepared from other sources, thus providing an increase in concentration of that fertilising constituent as well as combinations with potash and phosphate to form very concentrated fertilisers which have thereby very material economic advantages.

Many concentrated fertilisers and mixtures with potash and phosphate are now on the world's markets and their variety of form, low price and intensive propaganda seem to be the outstanding features of the trade.

The modern trend towards higher concentration may give rise to new problems. The older fertilisers derived from plant and animal by-products, or offal, or even inorganic fertilisers originating in natural deposits, contain greater or lesser amounts of accompanying impurities and are gradually becoming supplanted to some extent by the manufactured synthetic products of a high degree of purity. The application of these chemical fertilisers to the general run of soils containing sufficient of the lesser necessary inorganic constituents is not likely to involve any problems of deficiency from that source. But where these may be deficient or unavailable in soils the results of such deficiency in all probability may not be encountered with the cruder fertiliser materials as sufficient amounts of the necessary elements might be supplied as impurities.

Crude fertilisers may carry iron, manganese, arsenic, etc., etc. Future fertiliser practice must take into consideration the role of manganese and other elements which have been proved indispensable to plant growth and function, and provision must be made for determining soil deficiencies where they occur and meeting them with appropriate supplements to the pure fertilisers applied.

Next to Germany, Great Britain is the most important producer—
Germany, over 600,000 tons annually fixed N.
England, over 70,000 tons annually fixed N.

Not only are Germany and Great Britain the chief producers but they are the chief consumers, and are also the most important exporting countries.

Germany exports over 150,000 tons N per annum.
Great Britain exports over 50,000 tons N per annum.
(includes by-product N)

With the exception of Chili and Norway no other country has any important surplus of nitrogenous products.

Future development of the nitrogen-fixation industry.—The industry is of great interest both from an economical and a political standpoint. Economically the role of fertilisers will be to meet the world's growing demand, not only for food but for every kind of useful vegetable and animal product. Hitherto the increased demand has been met by extending the areas of the world under cultivation, but the time will come when all further gains must be obtained from higher yields which can only be achieved by scientific cultivation involving the use of fertilisers in greater quantities. It is highly probable that the increased nitrogen output will be supplied by the Haber process or by some modification of it, and that the industry will be developed in those countries which possess cheap fuel and good water communication. It seems certain that the greater part of the output will come from a few works, each operating on a very large scale and so requiring very great financial resources. The larger the scale on which the process can be operated, the more likely it is to be commercially successful, for not only must the process for the production of nitrogen and hydrogen be carried out on a great scale by means of very expensive plant, but the whole of the process has to be controlled by technicians of the highest skill and training. It is not commercially remunerative to employ such people unless they are placed in charge of plant capable of large production.

Although the tendency has been to increase the scale of operations and to employ to a greater extent persons with a scientific training, a new factor has been introduced into the industry by the entrance into it of the greatest and most powerful chemical firms in the world. These firms have in the past been mainly concerned with the production of dyes and other chemical manufactures in which they require to employ highly trained staffs. Under the control of these firms the fertiliser industry has become one of the highly skilled technical industries in which the employment not only of the most able and highly trained technicians will be required, but also the constant help of a staff of research workers. It is of importance to note that an international combine of such firms is at present under consideration.

Australia and nitrogen fixation.—All the leading agricultural experiment and research stations of the world are experimenting with these new manures in order to determine the advantages. They are being utilised to an amazing extent in Great Britain and the Continent and are making rapid headway into India and Asia and have reached Australia. The attitude of Australia towards these fertilisers should be one of great interest. Agriculture in the greater part of the coastal area of the Commonwealth is approaching the intensive system, and particularly is this so in the Eastern States where in Victoria the transition stage is well advanced. Heavier dressings of fertilisers are required, and the proportional content of nitrogen is ever on the increase. Apart from the all important question of our wheat lands the most important crop in Australia is grass, and the question of top-dressing with fertilisers is only in its infancy.

A nitrogen-fixation plant for and situated in Australia has been under consideration by our largest Australian firms and also by the British syndicate as instanced by the periodic agricultural delegations of experts throughout Australia. Apparently insufficient scientific information in respect to Australia's peculiar soil characteristics and the speeding up of nitrification is not forthcoming as a basis for a reliable computation of probable annual consumption of synthetic products. Australia is in need of a nitrogen-fixation plant for defence purposes and has been repeatedly urged by those qualified to speak, so we should look forward to the definite establishment in Australia of a nitrogen-fixation plant in the future.

The following table, showing the consumption of nitrogenous fertilisers in various countries, is based on information published by the Economic and Financial Section of the League of Nations:—

Pounds per Acre per Year.

Europe.		**Asia.**	
Netherlands	38.2	Japan	9.8
Belgium	31.5		
Germany	13.0	**Africa.**	
Denmark	8.7	Egypt	8.1
Great Britain	7.1	South Africa	0.2
Norway	4.8		
Switzerland	4.6		
France	4.3	**America.**	
Spain	2.8	United States	1.8
Szechoslovakia	2.5	Canada	0.3
Sweden	2.3	Brazil	0.2
Poland	1.2		
Finland	0.9	**Australasia.**	
Austria	0.8	New Zealand	0.6
Estonia	0.2	Australia	0.2
Hungary	0.1		

FIELD EXPERIMENTS WITH WHEAT AT THE MERREDIN EXPERIMENT FARM.

I. THOMAS, Superintendent of Wheat Farms.

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In addition to the results already published in the March issue of the *Journal of Agriculture*, the following field experiments were conducted at the Merredin Experiment Farm last year:—

With Wheat—

Depth of Ploughing Experiment.
Mulching Experiment.
Fallowing Experiment.
Seasonal Planting Experiment.

The land on which the experiments were conducted was a rich clay loam, typical of the gimlet and salmon gum forest country. Except where otherwise specified (to suit the requirements of the various experiments), the land was treated in the following manner:—

It was ploughed to a depth of four inches with a disc plough during June, 1926, and twice cultivated with a springtyne cultivator during the spring. After heavy March rains it was again springtyne cultivated and during early April cultivated with a tandem disc cultivator. Immediately prior to planting, the fallow was again cultivated with a springtyne implement.

The monthly rainfall as recorded at the farm for 1927, together with the average for the past 16 years, is shown hereunder:—

Year.	Growing Period.													Total for Year.
	Jan.	Feb.	Mar.	Apl.	May	June.	July.	Aug.	Sep.	Oct.	Total.	Nov.	Dec.	
1927 ...	9	2	565	36	53	164	132	89	167	64	669	19	61	1,361
Av. 16 yr.	59	53	85	78	128	174	189	138	92	81	802	37	59	1,174

Although heavy rains fell in March, some anxiety was experienced owing to the light rainfall received after planting. Germination was very uneven and it appeared as though some of the seed had malted. However, 38 points of rain fell on May 8th and a good germination resulted.

DEPTH OF PLOUGHING EXPERIMENT.

The object of this experiment which has been conducted continuously for the past 13 years (commenced 1915), is to determine the comparative effects upon resulting crops of ploughing the land different depths. Three plots were required for the experiment, and were ploughed as follows:—

Plot 1—4 inches, representing shallow ploughing;
Plot 2—6 inches, representing medium ploughing; and
Plot 3—8 inches, representing deep ploughing.

The plots were each one-eighth of an acre in area and were repeated eight times, three sections being cut for hay and five harvested for grain.

The plots were ploughed to their respective depths with a disc plough in June, 1927, twice cultivated in spring, and once in March, disc cultivated in April, and springtyne cultivated again in May.

The variety "Nabawa" was sown at the rate of 45lbs. of seed per acre, and superphosphate (22 per cent.) applied at the rate of 112lbs. per acre.

The results obtained last year, together with the average results for the past 13 years, are given hereunder:—

HAY YIELDS.

Variety "Nabawa." Seed, 45lbs. 112lbs. Superphosphate per acre. Planted, 22nd April, 1927.

Treatment.	Computed Yield per Acre.			Average yield, 1927.	Percentage yield, 1927.	Percentage Yield.
	Section 1.	Section 2.	Section 3.			
	cwt. qr. lb.	cwt. qr. lb.	cwt. qr. lb.	cwt. qr. lb.		
Ploughed 4in. deep	42 2 24	41 2 8	41 0 16	41 3 6	105	105
Ploughed 6in. deep	39 3 12	39 2 0	39 1 20	39 2 11	100	100
Ploughed 8in. deep	44 1 12	44 3 4	45 1 12	44 3 9	113	105

GRAIN YIELDS.

Variety "Nabawa." Seed, 45lbs. Superphosphate, 112lbs. per acre. Planted, 22nd April, 1927.

Treatment.	Computed Yield per Acre.					Average Yield, 1927.	Percentage Yield, 1927.	Percentage Yield.
	Section 1.	Section 2.	Section 3.	Section 4.	Section 5.			
	bus. lb.	bus. lb.	bus. lb.	bus. lb.	bus. lb.	bus. lb.		
Ploughed— 4in. deep	31 36	31 20	32 0	32 40	32 56	32 6	101	104
6in. deep	31 36	31 28	31 52	31 12	32 48	31 47	100	100
8in. deep	31 4	30 56	31 28	32 0	31 52	31 28	99	100

The yields obtained from the grain plots this year are very even, and from these, together with the average results from this experiment for the past 13 years, it is obvious that there is no advantage gained by ploughing the land deeper than 4 inches for a grain crop.

In the hay section there was an increase in the plots ploughed to a depth of 8 inches. It is difficult to understand why this is so because the yield from plots ploughed 4 inches deep are greater than those obtained from the plots which were ploughed to a depth of 6 inches. In the percentage results for the past 13 years, the yields of the 4 inches and 8 inches ploughing are equal, and from these it can be concluded that over an average of years, provided the work is done thoroughly, 4-inch ploughing is the most economical depth.

MULCHING EXPERIMENT.

The object of this experiment is to determine how far and under what conditions the cultivation of winter fallowed land is profitable during the spring and summer. The land on which the experiment was conducted was ploughed in June, 1926, to a depth of 4 inches with a disc plough. Three plots were necessary, and to meet the requirements of the experiment, were treated as follows:—

Plot 1.—Cultivated during spring, again when required during summer after a fall of rain of 25 points or over, and again prior to seeding, the object being to maintain a mulch throughout the fallowed period and to destroy weed growth.

Plot 2.—Cultivated during spring and prior to seeding only (ordinary fallow).

Plot 3.—Cultivated just prior to seeding only (neglected fallow).

The plots, which were each one-eighth of an acre in area, were repeated eight times, three sections being cut for hay and five harvested for grain.

Plot 1 this year received no cultivation during the summer as no rain of any consequence fell until the latter end of that period. Towards the end of March it received one cultivation with a springtyne. During this month, although frequent falls of rain were experienced, the weather conditions did not permit of further cultivation.

However, it was cultivated again early in April and, together with Plots 2 and 3, just prior to seeding.

The surfaces of Plots 2 and 3, before being cultivated prior to seeding, were very hard and rough, requiring several extra cultivations to bring it to a desired seed bed. The germination of these plots was very uneven.

The experiment was planted on the 29th April, the variety "Nabawa" being sown at the rate of 45lbs. per acre with superphosphate (22 per cent.) at the rate of 100lbs. per acre.

The following table shows the results recorded for 1927 together with the average for 12 years:

HAY RESULTS.

Variety "Nabawa." Seed, 45lbs. Superphosphate, 100lbs. per acre.
Planted, 29th April, 1927.

Treatment.	Computed yields per acre.			Average Yield, 1927.	Percentage yield, 1927.	Percentage Yield.
	Section 1.	Section 2.	Section 3.			
	cwt. qr. lb.	cwt. qr. lb.	cwt. qr. lb.	cwt. qr. lb.		
Mulched in Spring, after rain during summer and before planting	41 2 0	42 1 12	46 2 8	43 0 8	91	103
Mulched in Spring, and before planting only	45 2 8	46 3 4	48 2 0	46 3 23	100	100
Mulched before planting only	42 0 0	45 3 4	46 0 16	44 2 16	95	98

GRAIN RESULTS.

Variety "Nabawa." Seed, 45lbs. Superphosphate, 100lbs. per acre.
Planted, 29th April, 1927.

Treatment.	Computed yield per acre.					Average Yield, 1927.	Percentage Yield, 1927.	Percentage Yield.
	Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.			
	bsh. lb.	bsh. lb.	bsh. lb.	bsh. lb.	bsh. lb.	bsh. lb.		
Mulched in Spring, after rain during summer and before planting	34 16	31 44	29 44	32 56	30 32	31 48	96	102
Mulched in Spring, and before seeding	33 20	33 12	33 44	33 20	31 36	33 2	100	100
Mulched before seeding only	31 36	32 24	32 16	30 56	31 36	31 45	96	94

The varying average yields from the three plots of this experiment this year are rather difficult to understand in view of the rainfall and the treatment of the plots during the fallowed period. The rainfall was such that the cultivation given to No. 1 plot was very little more than that given No. 2 plot. It is intended, however, to carry out investigations in the laboratory in connection with this experiment.

The percentage results for the past 12 years indicate that the general practice should be to cultivate the fallowed land in spring and again prior to seeding, and that in cases where the ground is weedy this cultivation should be supplemented by additional cultivations after rain during the summer month, which not only assist to conserve moisture, but it also destroys weed growth and so assist to control the disease "Take-all."

EARLY AND LATE FALLOWING EXPERIMENT.

The object of this experiment is to determine whether early or late fallowing has any effect on the resultant wheat crop on heavy forest land. This is the fourth year that the experiment has been conducted.

Two plots were used, each half an acre in area, one-eighth of an acre being cut for hay and three-eighths harvested for grain. The early fallowed plot was ploughed 4 inches deep with a disc plough on the 4th June, 1926. The state of the land at this time was good for ploughing, the work being done under the most favourable conditions. The late fallowed plot was also ploughed to a depth of 4 inches on the 28th August, 1926. This plot turned up very lumpy owing to the land becoming somewhat hard, resulting in a much less vigorous and more uneven germination.

The variety "Nabawa" was sown at the rate of 45lbs. of seed per acre and superphosphate at the rate of 100lbs. per acre, on the 30th April, 1927.

Frequent patches of "Take-all" appeared in the late fallowed plot. This disease was also present to a small extent in the early fallowed plot.

The following tables show the yield for 1927, together with the average for the past four years:—

HAY YIELDS.

Variety "Nabawa." Seed, 45lbs. per acre. Superphosphate, 100lbs. per acre.

Date fallowed.	Computed Yield per acre, 1927.	Percentage, 1927.	Average, 4 years.	Percentage, 4 years.
	cwt. qr. lbs.	%	cwt. qr. lbs.	%
First week in June	45 0 8	100	38 2 4	100
Third week in August	38 0 24	85	31 3 16	83

GRAIN YIELDS.

Date fallowed.	Computed Yield per acre, 1927.	Percentage, 1927.	Average, 4 years.	Percentage, 4 years.
	bush. lbs.	%	bush. lbs.	%
First week in June	25 52	100	22 6	100
Third week in August	24 48	96	18 2	82

The heavy rains which fell in March, 1927, particularly favoured the late fallow. Since the moisture which had not been conserved by this fallow during 1926 was replaced by these March rains, the difference between the yields of the two plots is not so marked as that of previous years. However, the average results of the past four years are strongly in favour of the practice of early fallowing both for hay and for grain yields.

Some of the advantages of early fallowing are:—

(1.) Easier ploughing.

(2.) A better chance is afforded for the destruction of weeds.

(3.) More moisture is conserved in normal years by the longer period, thus providing a better insurance against dry spells at critical periods.

(4.) Early fallowing renders it possible to work the soil down to a better tilth, resulting in an even and strong germination.

(5.) Stimulates the production of nitrates and sweetens and aerates the soil.

(6.) Observations show that early fallowing helps to check "Take-all."

(7.) Increased yields. Over a period of four years the early fallowing has given an increased yield of 6cwts. 2qrs. 16lbs. for hay and 4 bushels 4lbs. for grain per acre.

SEASONAL PLANTING EXPERIMENT.

Three plantings are made in April, May and June, and the objects of the respective planting are as follow:—

April.—(a) To determine whether any other variety when planted in April is more prolific than the prinicipal variety Nabawa planted in May.

(b) To determine the variety most suitable for planting in April.

May.—To determine the variety whether Late, Midseason or Early most suitable for the principal planting in May.

June.—(a) To determine whether any other variety when planted in June is more prolific than the principal variety Nabawa planted in May.

(b) To determine the variety most suitable for planting in June.

APRIL PLANTING.

Seed, 45lbs. per acre. Superphosphate, 100lbs. per acre.

Date of Planting.	Variety	Maturity.	Computed Yield per acre.										Average Yields, 1927.	
			Sec. 1.		Sec. 2.		Sec. 3.		Sec. 4.		Sec. 5.			
			bsh.	lb.	bsh.	lb.	bsh.	lb.	bsh.	lb.	bsh.	lb.	bsh.	lb.
April 21st	Canberra ...	Early ...	29	44	31	36	30	16	31	12	31	28	30	51
May 13th	Nabawa (Control)	Midseason	24	1	24	40	24	0	24	0	24	32	24	17
April 21st	Joffre	Midseason	25	20	24	56	25	28	25	4	25	44	25	18
April 21st	Nabawa	Midseason	31	52	31	28	31	44	31	12	33	36	31	58
May 13th	Nabawa (Control)	Midseason	25	12	25	44	26	32	24	48	27	20	25	55
April 21st	Gallipoli	Late mid-season						Yield	lost	by	hail.			
April 21st	Gluyas Early ...	Early ...	33	20	31	28	32	48	32	48	33	28	32	46
May 13th	Nabawa (Control)	Midseason	23	52	24	8	24	24	23	44	24	24	24	6
April 21st	Canberra ...	Early ...	29	36	28	48	30	32	31	12	32	26	30	30

MAY PLANTING.

Seed, 45lbs. per acre. Superphosphate, 100lbs. per acre.

Date of Planting.	Variety.	Maturity.	Computed Yield per acre.										Average Yield, 1927.	
			Sec. 1.		Sec. 2.		Sec. 3.		Sec. 4.		Sec. 5.			
			bus.	lb.	bus.	lb.	bus.	lb.	bus.	lb.	bus.	lb.	bus.	lb.
May 14th	Canberra ...	Early ...	30	8	30	32	31	52	31	36	28	40	30	34
,, 13th	Nabawa (Control)	Midseason	28	0	28	16	29	28	29	52	30	24	29	12
,, 14th	Joffre	Midseason	22	0	24	16	25	36	25	4	24	48	24	21
,, 14th	Gallipoli	Late mid-season			Yield		lost	by	hail.					
,, 13th	Nabawa (Control)	Midseason	26	48	30	8	29	44	30	24	28	32	29	7
,, 14th	Gresley	Early ...	23	20	24	48	25	52	25	12	24	24	24	43
,, 14th	Canberra ...	Early ...	28	0	27	4	29	20	28	40	27	36	28	8
,, 13th	Nabawa (Control)	Midseason	28	40	26	40	29	20	27	20	27	4	27	49
,, 14th	Carrabin ...	Early ...	32	40	30	24	34	24	32	24	32	24	32	27
,, 14th	Comeback ...	Early ...	23	4	22	48	26	0	24	24	22	40	23	47
,, 13th	Nabawa (Control)	Midseason	30	0	29	12	30	56	29	52	25	36	29	7
,, 14th	Merredin ...	Early ...	33	28	33	36	33	52	31	4	31	44	32	45
,, 14th	Gluyas Early ...	Early ...	32	24	34	8	32	56	32	16	32	8	32	46
,, 13th	Nabawa (Control)	Midseason	29	44	30	24	28	16	29	20	27	20	29	1
,, 14th	Noongar	Very Early	27	52	27	52	27	20	28	0	27	4	27	37

JUNE PLANTING.

Seed, 45lbs. per acre. Superphosphate, 100lbs. per acre.

Date of Planting.	Variety.	Maturity.	Computed Yield per acre.										Average Yield, 1927.	
			Sec. 1.		Sec. 2.		Sec 3.		Sec. 4.		Sec. 5.			
			bus.	lb.	bus.	lb.	bus.	lb.	bus.	lb.	bus.	lb.	bus.	lb.
June 15th	Nabawa	Midseason	20	56	21	52	20	0	22	8	21	20	21	15
May 13th	Nabawa (Control)	Midseason	28	16	29	36	28	48	29	12	29	20	29	2
June 15th	Gluyas Early ...	Early ...	25	36	25	20	24	24	27	4	25	20	25	37
June 15th	Canberra ...	Early ...	21	44	22	8	20	8	22	48	21	52	21	44
May 13th	Nabawa (Control)	Midseason	28	40	28	32	27	12	28	48	27	28	28	8
June 15th	Merredin ...	Early ...	25	52	23	52	24	16	25	12	24	24	24	43
June 15th	Gresley	Early ...	18	8	17	52	19	12	18	40	19	20	18	38
May 13th	Nabawa (Control)	Midseason	26	56	27	44	28	16	28	16	29	12	28	5
June 15th	Carrabin ...	Early ...	24	40	24	48	27	12	Lost by hail		25	28	25	32
June 15th	S.H.J.	Very Early	23	4	24	24	26	24	25	44	24	40	24	55
May 13th	Nabawa (Control)	Midseason	25	52	28	8	30	24	29	28	27	44	28	19
June 15th	Noongar	Very Early	22	16	20	56	22	56	22	32	23	36	22	27

Like those of the Chapman and Wongan Hills Experiment Farms, the above results are for one year only and, consequently, no definite conclusions may be deduced.

As was also the case at Wongan Hills, all varieties in the April planting yielded better than the control plots of Nabawa planted in May. At Merredin, however, germination of the April plots was not general until after the first week in May. This would therefore interfere with the object of the experiment and detract from the value of the comparison.

However, the results indicate, as do those of the similar experiments at the Wongan Hills and Chapman Farms, that it is undesirable to delay planting operations until June.

FALLOW COMPETITIONS, 1928.

Judge—G. L. THROSSELL, Dipl. Agric., Agricultural Adviser.

In addition to the Fallow Competition of the Wyalcatchem Agricultural Society, the results of which were published in the March issue of the *Journal of Agriculture*, the following Agricultural Societies conducted fallow competitions during 1928:—

1. Nungarin Agricultural Society.
2. Doodlakine-Baandee Agricultural Society.
3. Bruce Rock Agricultural Society.

In connection with the judging of the Nungarin and Doodlakine-Baandee competitions the acknowledgments of the judge are due to the assistance rendered by Dr. Teakle, Plant Nutrition Officer.

NUNGARIN AGRICULTURAL SOCIETY.

One of the conditions of the 1928 Cropping Competition conducted by the Nungarin Agricultural Society is that only those competitors who had entered for the 50-acre Fallow Competition would be eligible to enter in the Cropping Competitions. No less than 15 entries were received for the Fallow Competition, an indication of the healthy rivalry which exists amongst the farmers in the district. An interesting point about this competition, and one which considerably enhances its value, was that almost without exception the 50-acre plot entered and judged was representative of the whole area fallowed by the exhibitors and had received practically the same cultivation. That is to say, the plots were strictly a commercial proposition, and not small specially prepared areas set aside for the competition.

Judging took place from February 16th-18th, inclusive, and the scale of points under which the awards were made was as follows:—

	Points.
Moisture	40
Mulch	10
Absence of Weeds	10
Consolidation	20
Uniformity of preparation ..	20
Total	100

The rainfall recorded from the time of fallowing until judging is shown in the table hereunder:—

——	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total.
Nungarin ...	210	209	67	122	88	26	33	51	806
Lake Brown ...	149	202	78	178	24	22	23	31	707
Talgomine ...	210	192	110	174	49	16	7	30	788
Mukinbudin ...	219	226	70	173	22	18	13	63	804
Mangowine ...	309	236	100	135	28	50	15	119	992

The points awarded to the various competitiors are set out in the following table.

NUNGARIN AGRICULTURAL SOCIETY.

50-ACRE FALLOW COMPETITION—1928.

Competitor.	Address.	Moisture. 40	Mulch. 10	Absence of Weeds. 10	Consolidation. 20	Uniformity of Preparation. 20	Total. 100
L. Dumsday ...	Talgomine ...	35	9	9	19	19	91
G. H. Herbert ...	Nungarin ...	35	9	7	19	19	89
F. A. Williams ...	Mangowine	35	9	7	18	19	88
G. T. Young ...	Talgomine ...	36	7	9	18	17	87
J. Mulqueeny ...	Lake Brown	34	8	10	17	18	87
Creagh Bros ...	Kwelkan ...	33	8	8	18	19	86
A. G. Reynolds	Mukinbudin	32	9	6	18	19	84
H. P. Jolly ...	Mangowine	30	7	8	17	19	81
C. W. LeVaux ...	Nungarin ...	29	7	8	18	18	80
J. H. Johnston ...	Mangowine	29	7	7	17	19	79
Watson Bros. ...	Nungarin ...	29	8	8	16	18	79
H. G. Payne ...	Nungarin ...	27	7	9	17	18	78
R. C. Fitzpatrick	Nungarin ...	27	7	9	16	18	77
E. H. Goode ...	Mangowine	29	7	5	19	17	77
S. J. Benson ...	Nungarin ...	26	7	7	16	18	74

First place was gained by Mr. L. Dumsday, of Talgomine, with 91 points. The land, which originally carried tea-tree and gimlet, was ploughed with a disc plough to a depth of 3½ inches in July. It was scarified with a Gersch scarifier in August, and then harrowed after rain in November. This fallow was in very good condition when inspected. The moisture content was high and found just beneath the consolidated seed bed, which was covered by a nice even mulch about 2½ inches deep. A little barley grass was noticed. The seed bed was well consolidated and the whole fallow very uniformly prepared, and well deserved the position which it gained in the competition.

Mr. G. H. Herbert gained second place with 89 points. His land was grey morrel. He scarified it to a depth of 2½ inches in June and then cross-scarified it again in August, the last working being shallower than the first. By working his land in this manner, Mr. Herbert has obtained a well consolidated seed bed for this class of country. The moisture content was as good as the winning entry, though not quite so near the surface. A nice shallow mulch was obtained, but the chief fault was the presence of a fair amount of barley grass which had gone to seed.

Mr. F. A. Williams was placed third with 88 points. His entry was salmon and gimlet country and was ploughed in July with a mouldboard

to a depth of 4 inches. It was harrowed with a heavy set of harrows in August, and cultivated with a Gersch duck-foot scarifier in September. The moisture content was good and the mulch was in good tilth but a little deep in places. The "Summer Thistle" or "Potato Weed" (*Solanum hoplopetalum*) was rather bad in places. The seed bed was not so well consolidated as it might have been, while at one end, where it was apparently extra wet, when ploughed, it was rather cloddy. The following table shows the cultural methods employed by the competitors:—

NUNGARIN AGRICULTURAL SOCIETY.

CULTURAL METHODS.

Competitor ...	L. Dumsday.	G. H. Herbert.	F. A. Williams.	G. T. Young.	J. Mulqueeny.
Timber ...	Tea-tree and Gimlet	Morrel	Salmon and Gimlet	Salmon and Gimlet	Gimlet and Mallee
Ploughed ...	July	June	July	July	July
Make of Plough	Disc	Scarifier	Mouldboard	Mouldboard	Disc
Depth ...	3½ inches	2½ inches	4 inches	3 to 4 inches	3 to 4 inches
Cultivation ...	Scarified in August with Gersch scarifier. Harrowed in November	Cross scarified in August	Harrowed in August. Cultivated in September with a Duckfoot scarifier	Skim ploughed in September with a Sundercut	Springtooth cultivated in October.

Competitor ...	Creagh Bros.	A. G. Reynolds.	H. P. Jolly.	C. W. Le Vaux.	J. H. Johnston.
Timber ...	Salmon and Gimlet	Salmon and Gimlet, mostly Salmon	Salmon, Gimlet and Morrell	Jam and Tea-tree	Salmon and Gimlet
Ploughed ...	Middle July	Early June	End July	July	End June
Make of Plough	Disc	Mouldboard	Mouldboard	Mouldboard	Disc
Depth ...	3 to 4 inches	3 to 4 inches	3½ inches	4 inches	4 inches
Cultivation ...	Skim ploughed in October	Duckfoot cultivated in August. Harrowed in September and cultivated in October	Sundercut in October, harrowed in November	Springtooth cultivated in September	Sundercut in August and again second week in February

Competitor ...	Watson Bros.	H. G. Payne.	R. C. Fitzpatrick	E. H. Goode	S. J. Benson.
Timber ...	Salmon and Morrel	Salmon and Gimlet	Jam, Mallee, scattered Salmon and Gimlet	Morrel and Salmon	Salmon and Morrel
Ploughed ...	...	End July	July	July	August
Make of Plough	...	Disc	Disc	Disc	Sundercut
Depth ...	...	4 inches	4 inches	3 inches	3 to 4 inches
Cultivation ...	...	Sundercut end Sept. Tandem disced middle February	Sundercut in August and September	Cross ploughed immediately after, Springtooth cultivated in August	Cross cultivated with Sundercut beginning of October

BRUCE ROCK AND DISTRICT AGRICULTURAL SOCIETY CROP AND FALLOW COMPETITION, 1928.

The Fallow Competition.

Ten entries were received for the 50-acre Crop and Fallow Competition conducted this year by the Bruce Rock and District Agricultural Society. The fallows were judged during the third week in March (19th-21st, inclusive), after what is considered to have been one of the driest summers for many years.

The scale of points upon which the awards were made is as follows:—

	Points.
Moisture	40
Mulch	10
Freedom from weeds	10
Consolidation	20
Uniformity of preparation ..	20
Total	100

The following table shows the rainfall recorded from June till March at the centres nearest to the competitors.

Centre.	Fallowing rains.				Spring Rains.				Summer Rains.				Total Rain fall.
	June.	July.	Aug.	Total.	Sep.	Oct.	Nov.	Total.	Dec.	Jan.	Feb.	Total.	
Belka	188	201	123	512	180	41	...	221	25	25	...	50	783
Bruce Rock ...	176	158	133	467	172	71	23	266	29	16	...	45	778
Central Kuminin	185	165	118	468	76	160	10	246	...	56	...	56	770
(Lovell Hill), Yarding	205	206	107	518	175	53	22	250	28	29	...	57	825
Shackleton ...	228	209	130	567	158	64	29	251	16	118	...	134	952
Babakin ...	221	208	144	573	187	94	27	308	24	26	...	50	931

The following table gives the points awarded to the various competitors:—

BRUCE ROCK AND DISTRICT AGRICULTURAL SOCIETY.

CROP AND FALLOW COMPETITION—1928.

Points for Fallow.

Competitor.	Address.	Moisture. 40	Mulch. 10	Absence of Weeds. 10	Consolidation. 20	Uniformity of Preparation. 20	Total. 100
C. Smith & Sons	Yarding ...	35	9	9	19	19	91
E. M. K. & C. Allen	Central Kuminin	36	8	8	19	18	89
F. C. Farrall & Son	Yarding ...	32	9	10	18	19	88
S. A. Brown ...	Bungulluping	32	9	9	18	19	87
R. Mann ...	South Shackleton	32	8	10	19	18	87
Buller & Black...	Babakin ...	33	8	10	18	17	86
A. W. Wheeler ...	Babakin ...	33	8	9	18	18	86
H. H. Harling ...	Belka ...	25	9	10	19	19	82
W. D. Johnson ...	Bruce Rock	30	8	8	17	18	81
P. McCarthy & Son	Eujinyn ...	29	7	9	16	19	80

The winning fallow was that of Messrs. C. Smith and Sons, of Yarding, with 91 points. The land was chiefly salmon gum country with a few scattered gimlets. It was ploughed early in June with a mouldboard plough to a depth of 3 inches. The first cultivation was given with a Sundercut plough in August, followed by another working with a Springtyne cultivator in September. This entry was a nice even piece of fallow. The moisture content, which was surprisingly high considering the scanty spring and summer rains, was evenly distributed throughout the 50 acres. A good mulch of an even depth of 2 to 2½ inches covered a well consolidated, firm and level seed bed. Sheep had been run over the fallow, with the result that but very few weeds were present, only some small patches of wild oats being noticed. The preparation of this fallow had been carefully carried out, resulting in a very uniform entry.

Messrs. E. M. K. and C. Allen, of Central Kumminin, came second with 89 points to their credit. The land was heavy salmon and gimlet country. It was fallowed early in August with a mouldboard plough to a depth of 3 inches. It was harrowed in September and scarified with a Gersch scarifier at the beginning of October. This entry gained the distinction of having the highest moisture content of any fallow in the competition. The crab-holey nature of the paddock somewhat spoilt the uniformity of and accounted for hard patches on which barley grass grew. The mulch was a little lumpy in places due to the stiff nature of the soil.

Third place was gained by Messrs. F. C. Farrall and Son, of Yarding, who scored 88 points. Their land was also salmon and gimlet country and was ploughed with a mouldboard about the middle of July to a depth of 3-4 inches. It was cultivated with a Springtyne early in September and was not touched again until the beginning of January, when it was harrowed after a shower of rain. It received another harrowing about the end of January, and a final working with the same implement during the middle of February. The moisture content of this fallow was not as high as the first two entries. A nice mulch had been prepared, although it was a little fine in places. A good, firm and consolidated seed bed had resulted from the cultivations given. This entry was free from weeds.

The following table summarises the cultural methods of all competitors—

TABLE OF CULTURAL METHODS.

Competitor.	C. Smith & Sons.	E. M., K. & C. Allen.	F. C. Farrall & Son.	S. A. Brown.	R. Mann.
Timber ...	Salmon and scattered Gimlet	Salmon and Gimlet	Salmon and Gimlet	Salmon and Gimlet	Salmon and Gimlet
Ploughed ...	End of June	Early in August	Middle of July	End July, and beginning August	End of July
Type of Plough	Mouldboard	Mouldboard	Mouldboard	Mouldboard	Mouldboard
Depth ...	3 inches	3 inches	3–4 inches	3 inches	4 inches
Cultivations ...	Sundercut early in August. Cultivated with a springtooth in September	Harrowed in Sept. Scarified with a Gersch beginning of October	Cultivated with a springtooth early in September. Harrowed twice after rain in January and again beginning March	Sundercut in Sept. Cultivated with a springtooth beginning October and immediately after cross cultivated with same implement and again in middle of February	Scarified with a Gersch at end of August and again at and of September. Harrows dragged behind Gersch at last scarifying

Competitor.	Buller & Black.	A. W. Wheeler.	H. H. Harling.	W. D. Johnson.	P. McCarthy & Son.
Timber ...	Jam, Salmon, Gimlet, Mallee and White Gum	Salmon and Gimlet	Salmon and Gimlet	Salmon and Gimlet	Salmon Gum and odd Gimlet
Ploughed ...	July	End July, beginning August	End July, beginning August	Beginning September	Early in June
Type of Plough	Sundercut	Mouldboard	Half mouldboard and half Disc	Mouldboard	Disc
Depth ...	3–4 inches	3½–4 inches	4 inches	4 inches	4½–5 inches
Cultivations ...	Scarified with a May and Miller in September and October. Portion harrowed in September	Harrowed after ploughing. Scarified with a May and Miller end August and again beginning October. Light harrows dragged behind scarifier	Cultivated with a combine twice (crossed) in August and again in September	Cultivated with a springtooth in October, late in November and again at beginning of March	Sundercut in August. Cultivated with a combine in December after rain

An analysis of the data given in the above table yields some interesting information as to the methods of the competitors.

The mouldboard plough is easily the most popular type of plough, being used by no less than seven of the ten competitors. The Disc and Sundercut were used by one each, while one competitor used both a Disc and a Mouldboard.

Most of the fallowing was done in July, six of the ten competitors ploughing in that month. Two fallowed in June, one in August, and one in September.

Three inches was the popular depth of ploughing, six farmers ploughing to that depth. Three favoured 4 inches, while one competitor ploughed as deep as 5 inches. The trouble about deep ploughing is the greater difficulty, not only of ploughing deep over the shallow, but also in consolidating the seed bed and obtaining a shallow mulch. Especially in such a dry spring and summer as that just experienced, there has not been the opportunity to work the fallows down, and hence the deep ploughing has suffered.

The importance of placing a mulch on the fallows as soon after ploughing as possible, in order to conserve the soil moisture and kill the weeds before they have a chance to seed, is apparently fully realised, for five entries received the first cultivation in August, four in September, and only one as late as October. The average number of times the fallows were worked was three. Four received a second working in October, two in September, and one each in August, November, December, and January. Three only cultivated their fallows in the dry condition. This is not considered a wise practice, as there is a tendency to make the mulch too fine, and moreover there is a danger of spreading "Take-all."

As regards the cultivators used for the first cultivation, the sundercut was the most popular implement, being used by three competitors. The springtyne, scarifier and harrows were each used by two entrants and the

combine by one. For the second cultivation, the scarifier was used by four, springtyne three, combine two, and harrows one. From what was seen on the fallows inspected the scarifier makes an excellent job, not only in obtaining a good mulch and destroying weed growth, but it also leaves a nice level seed bed.

The fact that seven of the competitors ran sheep contributed no doubt to the cleanliness of the fallows, which were, on the whole, very good in this respect.

Tractors divided the honours with the horses, five competitors using tractors, and five, horses.

The standard of the fallows generally was very high and made the work of judging very difficult. This competition will be watched by many farmers in the district, besides the competitors themselves, and the fact that in almost every case the fallows entered were a portion of the whole fallow of the farm, and not a specially prepared plot, considerably enhances the value of the competition.

DOODLAKINE-BAANDEE AGRICULTURAL SOCIETY.

The Doodlakine-Baandee Agricultural Society conducted two Fallow Competitions this year; one an open competition for the best 50-acre plot of fallow for which a trophy valued at £5 5s. had been donated by J. W. Spillman, Esq., and the other a competition for a plot of fallow of the same area eligible for Agricultural Bank, Soldier Settlers and Industries Assistance Board clients only, and for which a trophy valued at £4 4s. had been presented by G. P. S. Jenning, Esq. There were 13 entries for the open competition and three for the other.

The scale of points under which both competitions were judged was as follows:—

	Points.
Moisture	40
Mulch	10
Absence of Weeds	10
Consolidation	20
Uniformity of preparation ..	20
Total . ..	100

Judging was carried out on February 14th and 15th. The following table shows the rainfall recorded at Doodlakine and Baandee from June until January, inclusive.

Place.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total.
Doodlakine ...	176	141	101	130	61	29	70	24	732
Baandee ...	178	134	90	138	49	32	44	9	674

The summer rains were very light this season, with the result that, apart from the spring cultivations carried out after fallowing, most of the fallows have received no further cultivations, for the competitors find that it does not pay to cultivate the fallows except after rains.

THE OPEN COMPETITION.

The following table shows the points gained by the various competitors:—

DOODLAKINE-BAANDEE AGRICULTURAL SOCIETY FALLOW COMPETITION.

Open for J. W. Spillman, Esq., Trophy.

No.	Competitor.	Moisture. 40	Mulch. 10	Absence of Weeds. 10	Consolidation. 20	Uniformity of preparation. 20	Total. 100
1	F. Birch	34	9	10	19	19	91
2	Barton & Sons ...	35	8	9	18	19	89
3	W. F. Noack	34	9	8	17	19	87
4	W. S. George (1) ...	33	8	9	18	18	86
5	W. S. George (2) ...	32	7	10	17	17	84
6	Prowse Bros.	30	7	7	18	17	79
7	J. H. Mutter	26	8	10	18	17	79
8	H. Birch	26	7	9	19	17	78
9	O. R. Saunders ...	25	7	9	16	16	73
10	A. E. C. Prowse ...	23	8	4	17	18	70
11	R. Barnes	23	6	10	15	16	70
12	J. W. Spillman ...	20	7	9	17	15	69
13	A. E. Noack	19	5	9	15	16	64

The winning entry, that of Mr. F. Birch, of South Bandee, was on heavy salmon and gimlet country. It had been well ploughed to an even depth of 3½ inches with a disc plough early in July. A mouldboard plough was then used to cross plough it about the end of the month. It was springtooth cultivated in September, harrowed after rain in October, and rolled to break the clods down in February. This entry was a very attractive piece of fallow. The moisture content was high and the seed bed was covered with a nice even mulch which was, however, a little deep in places. There was an entire absence of weeds, the consolidation was very good, and the preparation very uniform.

Messrs. Barton and Sons, of North Baandee, gained second place with 89 points. Their land was not quite so heavy as the winning entry. It was disc-ploughed to a depth of 3-4 inches in the middle of June, cultivated after ploughing, again during September, and during the first week in February with a Gersch scarifier. The moisture content of this fallow was slightly better than the winning entry but a point was lost for the presence of weeds, the so-called "Summer Thistle" or "Potato Weed" (*Solanum hoplopetalum*). The mulch was a little too fine, due probably to working in the dry state. The working of the land had been very uniformly carried out.

Third place was gained by Mr. W. F. Noack, of Baandee, with 87 points. This entry, which was on salmon gum and morrel land, had been dry-ploughed in February, 1927, with a skim plough to a depth of 3 inches and received five cultivations; the first was with a springtooth in June. It was then disced and harrowed in July and springtoothed again in October, and finally one in December to destroy the weeds. The moisture content was good, the mulch very even and in good tilth. A few points were lost for the presence of barley grass which had gone to seed, and the "Summer Thistle" or "Potato Weed" (*Solanum hoplopetalum*). The consolidation was not so good, the seed bed being a little loose.

The following table shows the cultural methods employed by the competitors:—

CULTURAL DETAILS.—OPEN COMPETITION.

Competitor.	F. Birch.	Barton & Sons.	W. F. Noack.	W. S. George. (1.)	W. S. George. (2.)
Timber ...	Salmon and Gimlet	Salmon and Gimlet	Salmon and Morrel	Salmon, Gimlet and Mallee	Salmon, Gimlet, Mallee and Tea-tree
Ploughed ...	July	Middle June	February	June	July
Type of Plough	Disc	Disc	Skim Plough	Mouldboard	Mouldboard
Depth	3½ inches	3–4 inches	3 inches	3½ inches	3½ inches
Cultivations ...	Cross ploughed with mouldboard in July. Springtooth cultivated in September. Harrowed in October and rolled first week in February	Cultivated after ploughing, again in middle of September, and during first week in February with Gersch scarifier	Cultivated with springtooth in June. Disced and harrowed in July Springtoothed in October and December	Cultivated with Sundercut in July; springtooth in August. Harrowed first week in September	Springtooth cultivated in August. Harrowed in September

Competitor.	Prowse Bros.	J. H. Mutter.	H. Birch.	G. R. Saunders.	A. E. Prowse.
Timber ...	Salmon and Gimlet	Salmon, Gimlet and Mallee	Salmon and Gimlet	Salmon and Gimlet	Salmon and Gimlet
Ploughed ...	July	July	July	July	June
Type of Plough	Mouldboard	Mostly Mouldboard, balance Disc	Mouldboard	Mouldboard	Mouldboard
Depth	3–4 inches	3½ inches	3 inches	3–4 inches	3–4 inches
Cultivations ...	Springtooth cultvated after ploughing in August. Harrowed in October and December	Harrowed in middle August, Disc cultivated end August. Harrowed in October	Skim ploughed beginning August, Springtooth cultivated end August	Springtooth cultivated in September and October. Disced end November	Disc cultivated in September Harrowed soon after

Competitor ...	F. Barnes.	J. W. Spillman.	A. E. Noack.		
Timber ...	Salmon. Gimlet and Mallee	Salmon and Gimlet	Morrell		
Ploughed ...	Early July	July	Early June		
Type of Plough	Mouldboard	Sundercut	Mouldboard		
Depth	2–4 inches	4 inches	4 inches		
Cultivations ...	Cultivated with a shearer duckfoot in August and with Springtooth end of September	Disc cultivated in August. Springtooth cultivated in October	Cross disced early in August and again in September		

The chief fault of the competitors was that the mulch was, in most cases, too deep. This, however, may be due to some extent to the absence of summer rains which would tend to consolidate it. The only weeds noticed were Barley Grass and "Summer Thistle" (*Solanum hoplopetalum*). The former is a bad weed in respect of its being a host or carry-over plant for Take-all. The latter weed not only looks bad on the fallow, but, where it is at all thick, robs the soil of a considerable amount of moisture, more so that is generally accepted, as was demonstrated on several occasions whilst judging.

DOODLAKINE-BAANDEE AGRICULTURAL SOCIETY.

Competition for Agricultural Bank, Soldier Settlers and I.A.B. Clients.

There were only three entries in this competition, all of whom were competitors in the Open Competition.

The points awarded are as follows:—

Competitor.	Moisture. 40	Mulch. 10	Absence of Weeds. 10	Consolidation. 20	Uniformity of Preparation. 20	Total. 100
Barton & Sons	38	9	8	18	19	92
F. Birch	34	9	10	19	19	91
J. W. Spillman	20	7	9	17	16	69

The winning entry, that of Messrs. Barton and Sons, was in another paddock to that of their entry in the Open Competition. The soil was of a similar nature and the fallowing was done in June with a disc plough to a depth of 3 inches. It was cross-ploughed with a disc in July, scarified in the middle of September, and again during the first week in February, after which it was harrowed. The moisture contents of this fallow was very good indeed, and was quite the best of any fallows inspected in either competitions. The mulch was better, not being so fine. There were a few more weeds in evidence.

Mr. F. Birch, who gained second place with 91 points, had a plot of 50 acres in the same paddock and alongside his entry in the Open Competition, and the whole paddock received the same treatment as that outlined in the other competition. Mr. J. W. Spillman gained 69 points for his entry which was a good deal below the standard of the others. The land was salmon and gimlet country and was ploughed to a depth of 4 inches with a sundercut in July. It was turned back with a disc in August and given a springtooth cultivation in October. The moisture content was very low. The mulch was too deep in places and had set down in others. Barley Grass, Wild Oats, and "Summer Thistle" were in evidence. Hard patches which had not been ploughed were also noticed.

The following table shows the cultural methods employed by the competitors:—

Name ...	Barton & Sons	F. Birch	J. W. Spillman
Timber	Salmon and Gimlet	Salmon and Gimlet	Salmon and Gimlet
Ploughed ...	June	July	July
Make of Plough	Disc	Disc	Sundercut
Depth	3 to 4 inches	3½ inches	4 inches
Cultivations ...	Cross ploughed in July; scarified in Sept., again in Feb. and harrowed	Cross ploughed with a mouldboard in July; springtoothed in Sept.; harrowed in Oct., and rolled in Feb.	Disced in August and springtoothed in Oct.

POTATO CHIPS.

G. N. LOWE,
Senior Potato Inspector.

Prolific Crops in the Young's Siding Area.

Despite the excessively dry summer, wonderful returns have been obtained from the peat swamps adjacent to Lake Saide, in the Young's Siding district.

Growers in the locality certainly were due for such a harvest after last season's disastrous floods, when after 7½ inches of rain in two days, practically the whole of their crops were lost through flooding.

This was certainly in the nature of a disaster to the growers, and may also be regarded similarly from a State standpoint, as undoubtedly the greater proportion of those crops would have been available as Government certified seed to be planted in other districts, particularly in the South-West where generally the need of thoroughly reliable and highly productive seed is so urgent.

The following illustrations give an idea of yields of portions of the crops harvested in the Young's Siding area.

Portion of T. H. Tonkins' crop which yielded at the rate of 21 tons per acre.

The demand for Government certified seed from this locality has been remarkable, as in less than three weeks from the time of digging, practically all available (about 200 tons) was sold for use in the South-West.

This is the more remarkable in that South-Western growers do not ordinarily commence to think about seed supplies until two months later under ordinary conditions.

Illustrating what a 21-ton crop looks like when bagged.

Fortunately, for the later comers, supplies of the same strain grown in the Capel and Donnybrook districts are, at the time of writing, available, but indications are that soon even these stocks will be exhausted.

It may be safely stated that the only really good crops in the South-West districts, taking Bunbury as a centre, are from Government certified seed or its near progeny. Despite the exceptionally dry summer this type of seed stands right out from the local strain, which is now heavily infected with Mosaic and Leaf Roll.

Fallowing in Benger Swamp.

The value of fallowing in Benger has been demonstrated most markedly this season.

Despite the fact that the land ploughed up for this purpose has only the period from February to June before going under water, the benefit to the subsequent crop is most clearly noticeable. One grower this season, with the idea of returning humus to the soil, sowed oats on a portion of his land as a trial, and he is undoubtedly on the right lines, as continuous cropping has certainly reduced this important constituent of the soil to a very low point. It is probable that a luxuriant quick growing crop such as maize ploughed under, when about one-third grown, would be of greater service in this direction as providing a greater wealth of green stuff.

Provision would, of course, have to be made for rolling the young growth down prior to turning under and thickly sowing to prevent the plants becoming too rank in growth.

Portion of A. E. Martin's crop, which yielded at the rate of 19½ tons per acre.

A Hot Formalin Dip.

A considerable saving in time in dipping of seed potatoes, which should be a regular operation, can be effected by taking two pints of formalin and adding to 30 gallons of water heated to 120° Fahrenheit. A reliable thermometer is necessary, of course, to check the temperature.

Whole or part bags of seed may be handled according to the type of receptacle used and the potatoes immersed in the solution for two minutes only, as against 1½ to 2 hours in the case of the *cold* formalin dip hitherto largely used. Allow the tubers to remain in the bag for an hour after removal from the tank and turn out to dry.

A supply of the stock solution, both hot and cold, should be at hand in order to more readily keep the correct temperature in the dipping tank.

Not only is the hot dip claimed to be more effective, but the saving of time where a quantity of seed has to be treated is very apparent.

It is moreover perfectly safe from the danger of possible poisoning, which is liable to occur when corrosive sublimate is used.

Benger Swamp Experiment.

It is regrettable that this experiment has turned out a failure, owing to wholesale lack of germination of the seed.

It was decided in order to save the delay necessary where the seed cut into wet bags on the site of the experiment, to prepare it at this office two days before and rail it down ready for an immediate start on arrival. Unfortunately the seed did not come to hand for five days during which the hottest weather of the season was experienced.

Superficially, at least, on examination, when it did finally reach the swamp, the seed appeared in good order, but failed later to germinate except in very meagre fashion, so as to render the experiment quite useless from a comparative standpoint.

One fact, however, is very clearly demonstrated, namely, that "wet bagged" seed must not be held longer than the specified time, that is from 24 to 48 hours in the summer.

If growers are warned by this experience, then the lesson from the experiment will not have been altogether lost.

It is interesting to note, moreover, in the case of seed which had been grown in the Burekup experiment with the inclusion of potash in the fertiliser, that the germination, despite the above accident, was more than double that of seed grown without potash.

It has long been the opinion of the writer that to the use of fertiliser containing no potash, may be ascribed the decrease in value from a seed standpoint of tubers so treated.

Repeated analyses disclose in experiments when "Delawares" are grown with potash, that the starch content is increased over three per cent.

The cook certainly values this extra starch in the tuber, and it would appear reasonable that the plant resulting will do likewise. Certain is it, that the plant, whether it be a potato or any other, is not going to thrive properly if the seed it springs from be deficient of a full supply of plant food.

The Planting Machine in Benger.

An improved type of planting machine has been used successfully in Benger Swamp this summer.

The improved planting machine used in Benger for the first time this summer.

The method followed, however, is to allow the machine to drop the seed and fertiliser in the furrow after a three-furrow plough, as illustrated.

Under this system there is a tendency for the seed to roll, and so cause loss by being squashed under the hoofs of the furrow horse.

The machine is designed to plant well cultivated mellow soil as a complete unit, but even as used in Benger, effects a considerable saving in the wages sheet.

Covering the seed and fertiliser with the three-furrow plow after the planting machine.

With a leader to share the heavy draft occasioned in Benger, a preferable method seemingly would be to use the machine to plant the freshly-ploughed land, and so obviate squashed seed.

The Difference in Strains of "Delaware."

The accompanying illustration depicts very clearly, once again, what loss and trouble may occur in a crop where poor seed is used.

Mr. Fred Mitchell, of Young's Siding (where, incidentally, the best seed in the State comes from), decided after seeing an advertisement, to order from a grower in another district which once had the name of providing reliable seed.

He ordered quite largely (to his subsequent sorrow), and when the consignment came to hand the tubers appeared desirable seed.

In the words of an advertisement, "Every picture tells a story," and this one shows, on either side a crop which later yielded 12 tons per acre, grown from his own seed, whilst the centre planted from the bought strain depicts only a few unhappy plants, which did not return anything like the weight per acre of seed planted.

The difference between good seed and merely *good looking* seed. Twelve tons per acre on either side and a complete failure in the centre.

Mr. Mitchell is a young grower, and as about two-thirds of his area was sown with the bought seed the results were most disheartening to him, and naturally occasioned a heavy loss.

What prospective buyers of Government certified seed should look for.

With all the publicity given this type of potato seed, both in this Journal and the public press, it is remarkable that there are still numerous buyers who do not know how to definitely identify the genuine from the spurious article.

The enviable reputation of Government certified seed has naturally enough given rise to imitation, which even if the sincerest form of flattery, is not productive of high potato yields.

Instances are continually noticed where speciously worded advertisements, of what is purported to be seed bearing the certificate and seal of this Branch, are catching the unwary buyer.

To again emphasise what the buyer must look for in order to be quite sure as to what identifies Government certified seed:—

1. The bag must be new, and bears the name and address of the grower in 2½in. stencilled letters.

2. The bag is double sewn, and on to the ends of the twine is attached with a leaden seal the certificate which has set out on it the name and address of the grower, the variety and grade, the inspector's name, and date of last inspection.

FARMERS' FIELD TRIALS.

H. RUDALL,
Field Officer.

The Farmers' Field Trials carried out during the 1927 season were variety trials and rate of seeding experiments with wheat.

The wheat variety trials were conducted at Bencubbin, Welbungin, Lake Brown, East Goomarin, Southern Cross, and Carnamah. Except in the trials at Carnamah where the area of each plot was 0.4 acre, all the plots were each half an acre in area. At all centres each trial was planted in duplicate.

In the wheat variety trials comparisons were made with S.H.J. and Noongaar with the control variety Gluyas Early. At Carnamah comparisons were made with Nabawa and Yandilla King, using Bena as control.

The rate of seeding trials were carried out with the very early variety Noongar. At Carnamah with the midseason variety Nabawa.

Field days (attended by the Director of Agriculture, Mr. G. L. Sutton) were held at each of the centres in the Eastern Wheat Belt, and great interest was evinced by those farmers present.

The details of the cultivation of the plots at the different centres are.—

CULTURAL NOTES.

Lake Brown (*J. Mulqueeny*)—*Variety Trial and Rate of Seeding Trial.*—The land was ploughed in June, 1926, 4 inches deep, ploughed back in September 2 inches deep, harrowed in December, 1926, after rain. Twice harrowed during March 1927. Cultivated with a springtyne cultivator at the beginning of May and prior to seeding. Sown 30th May. Variety trial 45 lbs. seed and 70 lbs. super. Rate of seeding trial, 70 lbs. super per acre.

Welbungin (*W. Bagshaw*)—*Variety Trial and Rate of Seeding Trial.*—The land was ploughed in September, 1926; lightly cultivated with springtyne cultivator in September and October, 1926, also in March, 1927. Tandem disced with harrows in May; sown 25th May. Variety trial, 45 lbs. seed, 75 lbs. superphosphate. Rate of seeding, 75 lbs. superphosphate per acre.

Southern Cross (*E. H. Richards*)—*Variety Trial, Rate of Seeding.*—The land was ploughed in June and July, 1926, to a depth of 3 inches. Cultivated with a springtyne cultivator in August and November, 1926, and again at the beginning of April, 1927, after heavy rain in March, and part

harrowed prior to seeding. Sown 19th and 20th May. Variety trial 45 to 50 lbs. seed, 75 to 80 lbs. superphosphate. Rate of seeding 75 to 80 lbs. superphosphate.

East Goomarin (*E. Randolph*)—*Variety Trial and Rate of Seeding Trial.*—The land was ploughed in July, 1926, about 3 to 3½ inches deep, and again at the end of August owing to the quantity of self sown. Cultivated with a springtyne cultivator in October, 1926, and again in April, 1927, after the heavy March rains, and harrowed in May just prior to seeding. Sown 24th May, variety trial 45 to 50 lbs.; superphosphate 75 to 80 lbs. Rate of seeding 75 to 80 lbs. superphosphate per acre.

Carnamah (*J. K. Forrester*).—The land was ploughed in July, 1926. Cultivated with a disc implement in September and with a springtyne cultivator in October, 1926; again with the same implement in April, 1927. Sown 27th and 28th April. Variety trial 50 lbs.; superphosphate 100 lbs. Seeding trial 100 lbs. superphosphate per acre.

RAINFALL AT VARIOUS CENTRES, 1927.

Centre.	Jan.	Feb.	Mar.	April.	Growing Period.						Total. May-Oct.
					May.	June.	July.	Aug.	Sept.	Oct.	
Lake Brown ...	...	...	518	72	34	149	202	78	178	23	664
Welbungin ...	...	9	462	27	110	277	190	50	197	25	849
Southern Cross ...	13	26	560	40	102	145	183	61	491	96	1,078
East Goomarin ...	31	...	501	49	47	180	233	73	197	44	774
Bencubbin ...	...	...	603	81	58	243	234	123	178	58	894
Carnamah ...	...	...	371	47	115	362	337	221	142	21	1,198

The Season.

The abnormal rains in March were general throughout the State, and in excess of those which fell during the corresponding month of the previous year (1926).

The resulting weed growth necessitated various cultivations during April and that portion of May prior to seeding. As a result of the high moisture content and these subsequent cultivations, the soil was in a good condition to receive the seed, and consequently the warm conditions of May complemented in producing a good and immediate germination.

The copious rains and frosts of June and July effectively checked a too vigorous plant growth, and assisted in the stooling of the wheat plants and the development of good root systems. What may be termed a dry spell occurred towards the latter end of August and the beginning of September. The resulting anxiety was alleviated by the knowledge, in many cases, of the security based on well-prepared fallow. On such land the crops maintained their colour and growth until timely rains, about the middle of September, relieved the situation. These rains continued throughout of the remainder of the month and into October, and, together with the warm weather during this latter month, provided ideal conditions for the maturing of the various varieties and the production of well-developed and full grains, particularly with the early wheat varieties.

The results obtained with the different trials are shown hereunder:—

VARIETY TRIALS.

Varieties.	Computed Yield per acre per plot.				
	J. Mulqueeny, Lake Brown.	W. Bagshaw, Welbungin.	E. H. Richards, Southern Cross.	E. Randolph, East Goomarin.	B. W. G. Hopwood, Bencubbin.
	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.
S.H.J.	13 10	23 0	23 18	14 46	14 46
Gluyas Early ...	16 2	24 0	31 54	18 6	15 4
Noongaar	12 28	23 0	25 52	14 30	13 32
S.H.J.	11 26	24 0	23 8	14 40	13 18
Gluyas Early ...	15 22	26 0	31 2	17 34	14 42
Noongaar	12 48	23 0	22 42	15 26	14 36

RATE OF SEEDING TRIAL—VARIETY NOONGAAR.

Rate of Seed.	Computed Yield per acre per plot—				
	J. Mulqueeny, Lake Brown.	W. Bagshaw, Welbungin.	E. H. Richards, Southern Cross.	E. Randolph, East Goomarin.	B. W. G. Hopwood, Bencubbin
	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.
30	16 16	21 0	24 24	14 24	12 38
45	16 4	23 0	24 18	14 58	12 46
60	16 4	24 0	22 22	15 32	*
30	12 24	21 0	25 2	13 34	13 44
45	13 24	24 0	23 20	14 44	13 50
60	14 34	25 0	21 32	15 12	13 56

* Owing to an accident with this plot the results were affected to such an extent that no comparison can be made,

VARIETY TRIAL.

Area: 4 acres.

J. H. Forrester, Carnamah.

Variety.	Yield per Plot.	Computed Yield per acre per Plot.
	bus. lbs.	bus. lbs.
Yandilla King ...	8 41	21 42
Bena (Control) ...	11 43	29 17
Nabawa	10 34	26 25
Yandilla King ...	8 9	20 22
Bena (Control) ...	11 55	29 47
Nabawa	9 29	23 42

Yandilla King and Bena were both badly affected by rust on the stalk.

RATE OF SEEDING TRIAL.

Variety Nabawa—Area: 4 acres.

J. H. Forrester, Carnamah.

Rate of Seed.	Yield per Plot.	Computed Yield per acre per Plot.
	bus. lbs.	bus. lbs.
60 lbs. ...	9 44	24 20
45 ,, ...	10 3	25 7
90 ,, ...	9 58	24 55
60 ,, ...	11 18	28 15
45 ,, ...	10 33	26 22
90 ,, ...	11 0	27 30

BEE-KEEPING NOTES.

H. Willoughby Lance,
Apiculturist.

This is the time of year when bee-keepers should be busy preparing for the swarming season and the time of increase.

Experienced bee-keepers are prophesying a good season. Jarrah is showing up well, and given the right climatic conditions, should yield a good surplus. Although the Marri (red gum) gave a good surplus in most districts in the past season, there is likelihood of this showing up well again next summer. Some districts, especially the coastal ones, can nearly always rely on a good average honey flow, but unfortunately the quality of honey is not usually of the best. The Taylorina honey from Albany district is an exception, this being a light clear honey of a somewhat peculiar flavour, and might be described as of the Fancy grade.

Coastal bee-keepers in most cases would be well advised to look out for a site where there is a probability of a honey flow from the Marri or Wandoo, and move their hives to the location when the flow starts. The home apiary, producing plenty of honey and pollen in the spring, will enable the bees to build up strong, then the hives can be moved to the district where the better class of honey is obtainable

In the preparation for the ensuing season, the overhauling of all unused hives and frames should be the first consideration, and no time should be lost in putting these in order, as in some districts with an early season the bees prepare for swarming in August.

The inside of body boxes and floors should be cleaned of propolis etc.; outside cracks stopped with putty; the edges of boxes where they rest on one another, or the floor board, planed up if necessary, so that the joints are a good fit, and no places for the smell of fresh honey in the hive to issue, and tempt robbers to try to get in and help themselves to the other fellow's sweets, instead of foraging for themselves.

The roof should be sound and a good fit. The complete hive should then be given one or two coats of good paint as may be required. The cost of paint is easily saved in many extra years of life of the hive, which should be painted at least every two years.

As soon as the weather is warm enough, all the colonies in the apiary should be gone through and faulty and old hives changed for those which have just been overhauled. These faulty hives should be put in order at once and can then be used to replace others that require attention, or kept for any increase.

Home-made Hives.—For the benefit of those who cannot afford to buy factory-made hives, particulars are here given of a hive made from petrol cases, which, if carefully made, will stand almost as well as factory-made ones.

The standard sizes of factory hives are 8 and 10-frame. The petrol case will make a good 9-frame hive.

The inside width of an 8-frame hive is 12⅛ inches; that of a 10-frame 14¼. A petrol case will make a hive 13¾. Standard frames are 1⅜ inches wide; 10 of these would equal 13¾ and be a tight fit, and be very difficult to manipulate. These hives therefore should only be used for 9 frames. In the supers these frames can be spaced out equally and should produce good fat combs easy to uncap. But in the brood chamber, they should be placed close together and a dummy board, say of ⅞-inch wood, inserted to take up the extra space. The reason for this is that the natural spacing of brood combs is 1⅜in. Drone brood requires a larger space, and if combs are further apart, the bees have greater facilities and inducements to build drone comb.

Figure 1 is a photograph of the complete hive shown with the body drawn back a little and the roof at the side. The floor is made of the sides of a petrol case ½in. thick, but if thicker wood is obtainable, so much the better. These are cut 15¾in. long, nailed to two pieces of 3 x 1 jarrah,

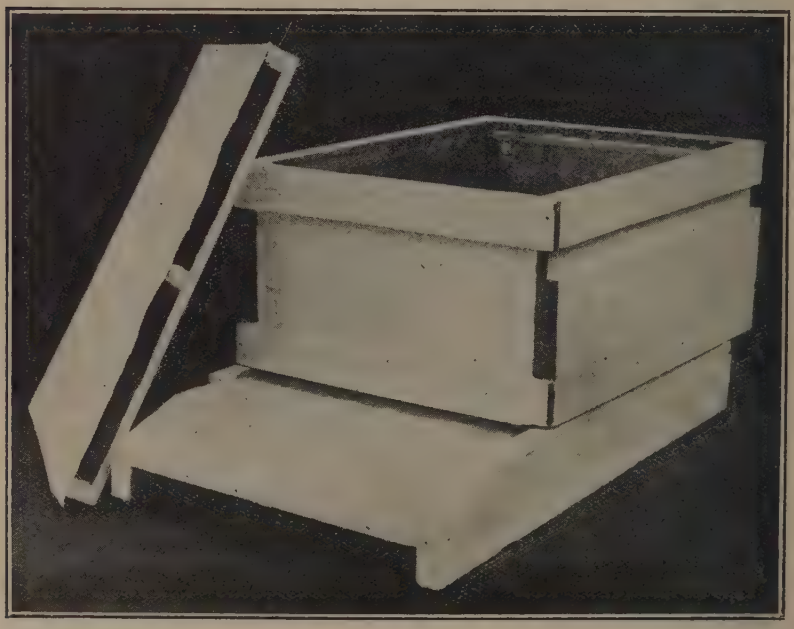
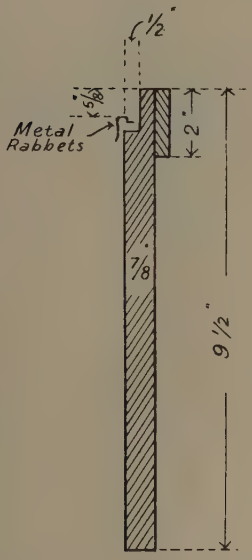


Fig. 1.

sloped off at front to allow of a good alighting board for the bees. The length of the level portion should be at least 23in. On this surface along the back of the two sides, nail strips of wood 1in. x ⅜in. for the body to rest on. This will raise it above the floor and allow an entrance all along the front.

For the body, use the two ends of the case, the top edge being rabbeted as shown in Fig. 2 and metal rabbets nailed on. These can be obtained from any dealer in bee goods. The object of the rabbets being to allow of bees running under the ends of the frames, and also giving less surface for the bees to stick tight with propolis.



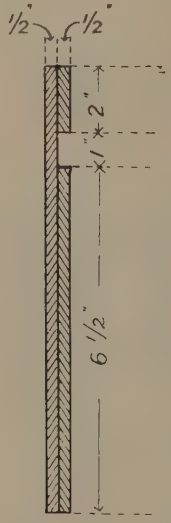
Section through AB

FIG. 2

The sides of the case are next cut to 20⅛in. long and nailed on to the two ends. The ends are now ⅞in. thick and the sides ½in.; ½in., however, is thin for the sides and does not conserve the heat of the hive as well as ⅞in.; therefore nail another thickness of ½in. wood outside this, but not the whole depth of side. The top strip may be 2in. wide. Then leave a 1in. gap; the bottom strip will then be 6½in. wide. Now nail along the top and bottom of front and back two more 2in. strips. These will strengthen the joints and the strips along the top will give a good hold all round for lifting the body. To make the method of putting the hive together more plain,

the ends of the wood in Fig. 1 are shown dark. Figure 2 shows a section through the ends and Fig. 3 through the sides. Figure 4 is a plan.

The roof can be made of ½in. wood from petrol cases, or if available thicker wood for preference. The side of a petrol case is the exact length required. Now prepare three strips of 1in. seasoned jarrah or good white wood, one inch, one and a quarter inches, and one and a half inches wide respectively. These form the cross-pieces to which the roof is nailed, the one and a half inch piece in front and the one inch piece at back, thus giving a slight slope to run the water off.



Section through CD

FIG. 3

The piece of galvanised iron 24½in. x 19in. is now obtained, the corners cut and the front and back bent over and nailed to the cover. The sides are bent at an angle of about 45deg. but not nailed. This will allow ventilation between the wood top and the iron roof, and will at the same time prevent the rain driving under. Should spiders make their web in this space, it is an easy matter to bend the sides up and clean out the web with a stick. In Fig. 1 the visible side is shown bent up for cleaning.

If galvanised iron is not available, a petrol tin may be used. Cut the ends out; cut the remainder down at two opposite corners, so that you have two pieces each composed of two sides of the tin.

These may now be used for the roof, one overlapping the other; the joint being nailed down along the centre cross-piece.

The whole should now be painted with two coats of white paint, but if tar is available it is preferable to dip in or paint the floor board with hot tar. The iron roof may be painted with red oxide if desired.

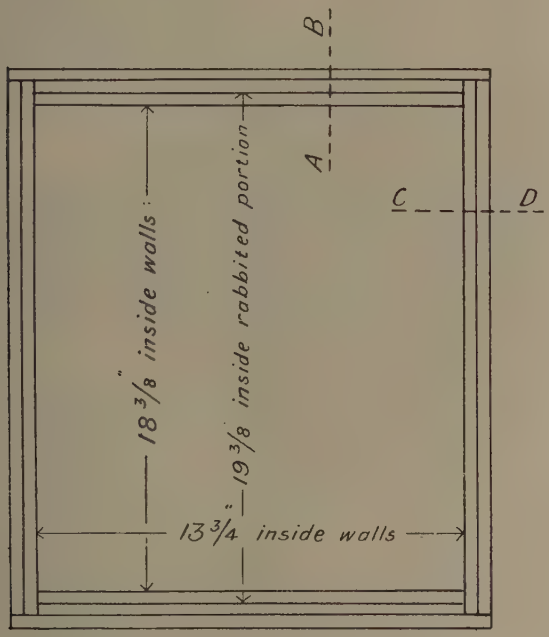


FIG. 4

Frames.—It does not usually pay to make these, as they must be made very exact and of good wood. The pattern most generally favoured is the Victorian pattern with wedge only. These must be nailed firmly and rigidly and well wired. The simplest method being with four parallel wires as in Fig. 5.

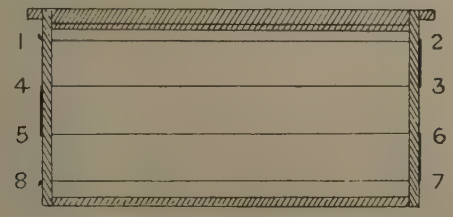


FIG. 5

Full sheets of foundation should be used, and threaded between the wires so that each alternate wire is on opposite sides of the foundation. The foundation is now pressed home into the top of the frame, the wedge inserted, and pressed hard against the foundation and secured with three or four nails. The frame and foundation is now placed on a piece of wood cut to fit inside the frame and placed on the table, the foundation and wires resting on it. Now warm the wheel embedder in a flame, and run briskly along the wire. This will slightly melt the wax and cause it to adhere to the wire. The frame is now ready for use

The nails required for the work are as follows:—

1¾ x No. 14 cement coated for nailing the sides to the ends, and the 2in. top and bottom strips; floor boards to the 3 x 1 jarrah; and the wood cover to the cross-pieces. (If, however, screws are available it will be better to use them for this work.)

1in. x No. 14 galvanised (as used for asbestos cement sheets) for nailing the centre portions of the 2in. strips, and the extra pieces 6½in. x 20⅛in. x ½in. at the sides.

⅝in. clouts for the iron roof.

½in. x No. 10 for metal rabbets, also for the wedges of frames.

1in. x No. 18 for nailing frames.

With this type of hive the body box can be used either as a brood chamber or as a super, as there is no piece cut out for entrance, the entrance being given by the strips nailed to the floorboard. The bottoms of the frames hanging flush with the bottom of the body, will give a ⅜in. bee space. The rabbeting at the top also allows a bee space between the top of the frames and the cover, or the frames of the super, as the case may be.

It should always be remembered that a natural bee space is 5/16in. and should never be less than ¼in. or the bees will stop it with propolis; if more than ⅜in. the bees will very likely build comb therein.

FIELD EXPERIMENTS WITH WHEAT AND OATS AT THE WONGAN HILLS LIGHT LANDS FARM.

I. Thomas,
Superintendent Wheat Farms.

A. R. Venton,
Farm Manager.

In addition to the experiments already published in the March (1928) issue of the Journal of Agriculture the following experiments were conducted at the Wongan Hills Light Lands Farm during 1927—

WITH OATS.

Oat Variety Trial.

WITH WHEAT—

Seasonal Planting Experiment.

The monthly rainfall as officially recorded during the year, together with the averages for the past fifteen years, is hereunder—

Year.	Jan.	Feb.	Mar.	Apl.	Growing Period.							Nov.	Dec.	Total for year.
					May.	June.	July	Aug.	Sept.	Oct.	Total.			
1927	...	7	301	34	143	221	260	89	57	50	820	5	11	1,178
Average 15 years ...	47	51	101	67	195	300	272	198	133	92	1,190	38	50	1,534

The rainfall of 8.20 inches for the growing period is generally considered favourable for this (light land) class of country. However, while the first half of the growing period (May-July) was very favourable, 6.24 inches being recorded against an average of 7.67 inches, the latter half was unfavourable. During this period (August-October) only 1.96 inches were recorded against an average of 4.23 inches. This amount fell on 32 different days and was usually followed by drying winds; consequently the crops did not get the full benefit and did not yield so well as was first expected.

The soil on which the experiments were conducted was mainly the smokebush type of country. This land was cropped once previously (1925-1926.)

OAT VARIETY TRIAL.

For this experiment the land was ploughed with the Sundercut plow during July, 1926; it was cross-ploughed during September to a depth of 2 inches with the same implement. At the initial ploughing heavy stubble from the previous crop was ploughed into the soil. Early in May, 1927, the land was Springtyne cultivated, this operation being repeated immediately prior to drilling, resulting in a good even tilth.

Seven varieties were used, and the early variety "Burt's Early" was used as the control. The plots were repeated eight times, five sections being harvested for grain and three for hay. The seed was planted at the rate of 40 lbs. per acre, and superphosphate was applied at the rate of 112 lbs. per acre. The plots were planted on the 10th May.

The results obtained are set out in the table hereunder—

OAT VARIETY TRIAL.

HAY YIELD.

Planted 10th May, 1927. Seed, 40lbs. per acre. Superphosphate. 112lbs. per acre.

Variety.	Maturity.	Computed Yield per Acre.			Average Yield per Acre.	Average Yield, 1926–27.	Percentage Yield 1926–27.
		Section 1.	Section 2.	Section 3.			
		C. Q. L.	C. Q. L.	C. Q. L.	C. Q. L.	C. Q. L.	%
Mulga	Early ...	23 3 4	24 1 20	27 3 4	25 1 9	24 3 6	115
Burt's Early ...	Early ...	24 0 16	25 0 8	20 0 0	23 0 8	21 2 6	100
Ruakura ...	Late mid-season	15 2 2	19 3 4	18 2 0	17 3 21	16 0 3	74
Algerian ...	Late... ...	20 1 12	27 2 8	20 0 8	22 2 19	19 0 0	82
Burt's Early ...	Early ...	25 0 0	28 1 4	25 0 16	26 0 16	23 0 10	100
Glen Innes No. 7	Early ...	24 3 20	27 0 16	26 0 0	26 0 3	23 3 11	103
Guyra	Midseason ...	26 1 20	23 1 4	21 1 4	23 2 19	20 1 0	93
Burt's Early ...	Early ...	24 3 12	25 1 6	19 2 16	23 1 2	21 2 17	100
Lachlan ...	Midseason ...	23 0 16	23 2 8	19 3 20	22 0 24	21 3 19	101

OAT VARIETY TRIAL.

GRAIN YIELD.

Planted 10th May, 1927. Seed, 40lbs. per acre. Superphosphate, 112lbs. per acre.

Variety.	Maturity.	Computed Yield per Acre.					Average Yield per Acre.	Average Yield, 1926-27.	Percentage Yield, 1926-27.
		Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.			
		bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	%
Mulga ...	Early ...	15 24	14 32	18 8	15 24	16 0	16 2	12 29	93
Burt's Early...	Early ...	13 32	17 0	18 0	18 24	17 32	17 2	13 24	100
Ruakura ...	Late mid-season	12 8	13 32	18 0	14 32	16 16	15 2	10 25	78
Algerian ...	Late ...	8 32	12 0	16 0	15 0	13 24	13 3	14 9	123
Burt's Early...	Early ...	10 32	*	13 24	14 0	13 32	13 2	11 24	100
Glen Innes No. 7	Early ...	7 16	11 32	11 8	12 16	11 8	10 32	12 16	107
Guyra ...	Midseason	9 8	12 24	13 8	11 24	10 24	11 18	13 13	106
Burt's Early...	Early ...	10 0	16 16	15 32	17 0	15 32	15 0	12 23	100
Lachlan ...	Midseason	‡	‡	‡	†	†	‡	‡	‡

* Owing to an accident when harvesting, the result of this plot is such that no comparison can be made. ‡ Shedding in these plots affected the yields of this variety to such an extent that the results cannot be used for comparison.

These average results indicate that, under the conditions of climate and soil at the Wongan Hills Farm, the early varieties of oats are better suited for hay than the midseason and late varieties, which in their turn appear to be the highest grain yielders.

SEASONAL PLANTING EXPERIMENT.

The land for this experiment was ploughed with the Sundercut disc plough early in July, and again at the latter end of August to turn in heavy stubble left after the first ploughing. At the end of September the land was skim ploughed to a depth of 2 inches with the same implement. During April it was cultivated with Springtyne cultivator, this operation being repeated immediately prior to seeding.

The seed was planted at the rate of 45 lbs. per acre, and superphosphate was applied at the rate of 112 lbs. per acre.

The plantings were made, *i.e.*, April, May, and June. All the plots, each one-eighth of an acre in area, were arranged in sections which were repeated to make each planting comprise five sections, each with a number of control plots of "Nabawa" planted in May. The objects of the various plantings are as follow—

April.

(a) To determine whether any other variety when planted in April is more prolific than the principal variety "Nabawa" planted in May.

(b) To determine the variety most suitable for planting in April.

May.

To determine the variety whether Late, Midseason, or Early most suitable for the principal planting in May.

June.

(a) To determine whether any other variety when planted in June is more prolific than the principal variety "Nabawa" planted in May.

(b) To determine the variety most suitable for planting in June.

APRIL PLANTING.

Seed—45lbs. per acre. Superphosphate—112lbs. per acre.

Date of Planting.	Variety	Maturity.	Computed Yields per Acre.					Average.
			Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.	
1927.			bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.
April 23	Yandilla King	Late	6 48	8 48	8 16	9 4	10 0	8 35
May 18	Nabawa (Control)	Midseason ...	6 32	7 20	8 32	7 52	8 48	7 49
April 23	Baroota Wonder	Late midseason	9 20	8 24	10 8	10 8	12 8	10 2
April 23	Early Nabawa ...	Midseason ...	10 8	10 8	11 20	12 48	12 56	11 28
May 18	Nabawa (Control)	Midseason ...	8 16	7 4	5 4	8 40	7 12	7 15
April 23	Gallipoli ...	Late midseason	10 16	10 32	10 40	13 4	12 16	11 22
April 23	Gluyas Early	Early ...	10 16	11 12	10 40	11 44	11 36	11 6
May 18	Nabawa (Control)	Midseason ...	7 20	7 36	7 36	9 36	8 8	8 3
April 23	Canberra ...	Early ...	11 36	11 28	12 0	9 28	13 20	11 34

MAY PLANTING.

Seed—45lbs. per acre. Superphosphate—112lbs. per acre.

Date of Planting.	Variety.	Maturity.	Computed Yields per acre.					Average.
			Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.	
1927.			bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.
May 16	Yandilla King	Late	5 12	4 56	5 52	7 52	6 40	6 6
May 18	Nabawa ...	Midseason ...	9 4	10 16	11 44	12 40	12 40	11 17
May 16	Baroota Wonder	Late midseason	7 20	8 24	9 52	9 52	10 24	9 10
May 16	Gallipoli ...	do.	9 12	9 4	10 24	11 20	10 40	10 8
May 18	Nabawa ...	Midseason ...	9 44	11 28	12 24	11 44	12 8	11 30
May 18	Gresley ...	Early ...	10 40	10 32	12 32	12 0	11 36	11 28
May 18	Canberra ...	Early ...	9 44	11 12	12 24	12 32	11 36	11 30
May 18	Nabawa ...	Midseason ...	10 0	10 32	12 8	11 28	10 40	10 58
May 17	Carrabin ...	Early ...	11 4	11 4	12 56	11 36	11 44	11 41
May 17	Comeback ...	do. ...	7 20	8 24	10 8	8 56	9 44	8 54
May 18	Nabawa ...	Midseason ...	10 8	10 32	13 28	12 24	12 40	11 50
May 17	Merredin ...	Early ...	7 52	9 28	10 16	10 16	9 28	9 28
May 18	S.H.J. ...	Very Early ...	7 36	9 12	11 4	10 8	10 56	9 47
May 18	Nabawa ...	Midseason ...	9 4	10 40	11 28	11 20	11 28	10 48
May 17	Noongaar ...	Very Early ...	8 8	9 4	8 24	9 4	9 20	8 48

JUNE PLANTING.

Seed—45lbs. per acre. Superphosphate—112lbs. per acre.

Date of Planting.	Variety.	Maturity.	Computed Yields per Acre.					Average.
			Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.	
1927.			bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.
June 20	Nabawa ...	Midseason ...	5 4	4 24	4 32	4 16	3 44	4 48
May 19	Nabawa (Control)	do. ...	9 36	8 0	8 48	8 40	8 0	8 37
June 20	Carrabin ...	Early ...	6 40	6 32	6 56	6 56	6 16	6 40
June 20	Gluyas Early	Early ...	3 52	5 4	5 36	5 36	4 40	4 58
May 19	Nabawa (Control)	Midseason ...	8 56	6 8	8 24	8 56	7 20	7 57
June 20	Canberra ...	Early ...	6 16	5 28	6 32	6 32	5 52	6 8
June 20	Merredin ...	do. ...	5 36	4 24	5 12	6 8	4 32	5 10
May 19	Nabawa (Control)	Midseason ...	8 8	8 0	7 28	9 12	6 56	7 57
June 20	Gresley ...	Early ...	8 8	5 36	5 20	6 16	5 20	6 8
June 20	S.H.J. ...	Very Early ...	4 16	4 52	5 12	6 24	5 52	5 19
May 19	Nabawa (Control)	Midseason ...	8 8	7 44	7 28	8 40	6 24	7 41
June 20	Noongaar ...	Very Early ...	4 32	4 56	5 4	5 28	...	5 0

The yield from this plot is so obviously below the average that some interference must have eventuated and therefore the result is not taken.

As at the Chapman and Merredin Experiment Farms the above results are for one year only and no definite conclusions can be drawn. All varieties of the April planting yielded better than the control variety ("Nabawa") planted in May. However, until continued experiments of this nature have proved otherwise, it is not advisable to plant early varieties in April. These varieties planted at this time are particularly liable to be affected by the disease Septoria, owing to their maturing out of season.

These results indicate, however, that reduced yields may be expected with all varieties when seeding is delayed until June.

WESTERN AUSTRALIA'S FIRST 1,000lbs. BUTTER COW.

P. G. Hampshire,
Superintendent of Dairying.

The Department of Agriculture has great pleasure in announcing the particulars of the production of the first 1,000 lbs. butter production cow in this State. The cow to achieve this proud distinction is Mr. A. W. Padbury's Guernsey cow "Picton's Trequean Flirt," Registered No. 747, aged 6 years 1 month. For a period of 365 days this cow yielded 16.675 lbs. milk, 870.06 lbs. butter fat, equal to 1,048.26 lbs. butter, and on the last day of test produced 35 lbs. milk and 1.885 fat. The test commenced on 23rd April, 1927, and concluded on 18th April, 1928. "Picton's Trequean Flirt" proved a remarkably consistent producer, apart from a decided drop in yield as a result of being sent to the Royal Agricultural Show from Koojan and being absent from the farm about fourteen days.

This Guernsey cow is not only an outstanding producer, but is also of exceptional breed type, securing the Championship in the Guernsey Class at the last Royal Agricultural Show, Perth, and being highly commented upon by the Judge—Dr. Kinross, President of the Guernsey Cattle Society of Australia. "Picton's Trequean Flirt" has been a consistent breeder and heavy milker. On her second calf she produced 449 lbs. butter fat, equal to 539 lbs. commercial butter in 273 days' test.

During the record production just completed, "Picton's Trequean Flirt" carried a calf 181 days, and is due to calve again this month. During the first five months of the record production she was milked three times daily, the last seven months twice daily.

Green, succulent pasture was available for only a short period of the year, the rainfall at Koojan being 16 inches per annum. This cow's yield is a remarkable tribute to the value of silage in the semi-dry areas of this State, as, without it, no green feed was available at Koojan for seven months.

During the period of test an accurate record has been kept by the offical testers (three officers check the yield at different periods) of the feed consumed by this cow, and the cost has been determined at ruling market rates. The accompanying charts show these particulars, together with the animal's breeding and monthly yields and values. After deducting the cost of feeding, and making deductions for the separation of the milk and providing for sufficient skim milk for feeding the calf, this cow shows a net of £47 9s. 6d.

Mr. A. W. Padbury and his herdsman (R. Guest) are to be congratulated upon the magnificent performance of this splendid Guernsey cow.

Breed: Guernsey.
Sex: Female.
Colour: Orange and Wh'te.
Name: "PICTON'S TREQUEAN FLIRT," 747 A.G.H.B.
Owner's Name: A. W Padbury, Koojan, W.A.
Age: Born, 5th March, 1921.
Bred by Ray Bros., Wellington Park
Address: Picton, N.S.W.

- Sire—"MINNAMURRA GAY BOY," 113
  Bred by Kinross Bros., Inverell N.S.W.
  - G. Sire—"HAYES' CHERUB" (imp.) 23
    - G.G. Sire—"GAY BOY," 2020 E.G.H.B.
    - G.G. Dam—"HAYES' GOLDEN CHERRY IV," 6901, E.G.H.B.
  - G. Dam—"DUNALPINE EMPRESS," 43
    - G.G. Sire—"HAYES' CHERUB," 23 (imp.)
    - G.G. Dam—"HAYES' EMPRESS," 8093, E.G.H.B. (imp.)
- Dam—"PICTON'S TREQUEAN VIOLET," 750
  Bred by Ray Bros., Wellington Park, Picton, N.S.W.
  - G. Sire—"MINNAMURRA'S GAY BOY," 113
    - G.G. Sire—"HAYES' CHERUB," 23 (imp.)
    - G.G. Dam—"DUNALPINE EMPRESS," 43
  - G. Dam—"TREQUEAN FANNY". (imp). 191
    - G.G. Sire—"DUKE SEQUEL" 1925, E.G.H.B.
    - G.G. Dam—"FANNY DU FOULON XIX," 7255, E.G.H.B.

MONTHLY STATEMENT OF EXPENDITURE FOR FEED AND RECEIPTS FROM SALE OF PRODUCTION.

Cost of Feed.	Butterfat Produced.	Butter Factory Price, per lb.	Value.	Milk produced.	Skim Milk.	Value at 2d. per gallon.	Total Value of Butterfat and Skim Milk.
£ s. d.	lbs.	s. d.	£ s. d.	gallons.	gallons.	£ s. d.	£ s. d.
2 0 4½	82·86	1 7	6 11 2	159	143	1 3 10	7 15 0
2 6 8½	83·82	1 7	6 12 8	169½	152½	1 5 5	7 18 1
3 14 10½	90·72	1 8	7 11 2	178½	160½	1 6 9	8 17 11
3 8 6½	81·12	1 8	6 15 2	153	138	1 3 0	7 18 2
3 4 1½	85·02	1 8	7 1 8	156	140	1 3 4	8 5 0
2 19 8	69·15	1 8	5 15 3	144	130	1 1 8	6 16 11
3 8 0½	68·79	1 8	5 14 8	133½	120½	1 0 1	6 14 9
1 17 11	60·63	1 8½	5 3 7	123	111	0 18 6	6 2 1
2 7 5½	68·97	1 8½	5 17 10	117	105	0 17 6	6 15 4
2 17 6	61·95	1 7	4 18 1	105	95	0 15 10	5 13 11
3 4 4	51·06	1 7	4 0 10	106½	95½	0 15 11	4 16 9
3 7 8½	65·97	1 7	5 4 5	122½	110½	0 18 5	6 2 10
34 17 3	870·06	...	71 6 6	1,667½	1,501½	12 10 3	83 16 9
		Less cost of Feed				£34 17 3	
		Less 180 gallons Skim Milk for rearing Calf ...				1 10 0	
							36 7 3
							£47 9 6

AGE OF COW AT COMMENCEMENT OF TEST—6 YEARS 1 MONTH.

Month.	Milk.	Test.	Butter Fat.	Milk for Month.	Butter Fat for Month.	Feed per day each Month.
1927.	lbs.	%	lbs.	lbs.	lbs.	
May 26	15½	5·4	·837	...	...	6lbs. bran, 3lbs. pollard, 2lbs. linseed meal, 20lbs. silage (wheaten and oaten) pasture, natural grasses.
	14	6·2	·868	...	...	
	23½	4·5	1·057	1 590	82·86	
June 23	16½	5·3	·874	...	...	6lbs. bran, 4lbs. pollard, 3lbs. linseed meal, 20lbs. silage (wheaten and oaten), pasture, natural grasses.
	14	6·1	·854	...	...	
	26	4·1	1·066	1,695	83·82	
July 21	18½	5·6	1·036	...	...	16lbs. oaten chaff, 6lbs. bran, 4lbs. pollard, 3lbs. linseed meal, 20lbs. silage (wheaten and oaten) pasture, oat crop and natural grasses.
	15	5·8	·870	...	...	
	26	4·3	1·118	1,785	90·72	
Aug. 18	16	5·5	·880	...	...	16lbs. oaten chaff, 6lbs. bran, 4lbs. pollard, 2lbs. linseed meal, pasture—oaten crop and natural grasses.
	12	6·0	·720	...	...	
	23	4·8	1·104	1,530	81·12	
Sept. 15	18	5·5	·994	...	...	10lbs. oaten chaff, 6lbs. bran, 4lbs. pollard, 3lbs. linseed meal, pasture—oat crop and natural grasses.
	12	6·2	·744	...	...	
	22	5·0	1·100	1,560	85·02	
Oct. 18	15	4·5	·675	...	...	16lbs. oaten chaff, 8lbs. bran, 4lbs. pollard. Pasture—natural grasses.
	13	5·0	·650	...	...	
	20	4·9	·980	1,440	69·15	
Nov. 18	17½	5·7	·997	...	...	18lbs. oaten chaff, 6lbs. bran, 3lbs. linseed meal. Pasture—natural grasses (dry.)
	27	4·8	1·296	1,335	68·79	
Dec. 15	14½	5·9	·855	...	...	3lbs. bran, 3lbs. pollard, 3lbs. crushed oats, 2lbs. linseed meal, 30lbs. silage. Pasture—natural grasses (dry.)
	26½	4·4	1·166	1,230	60·63	
1928.						
Jan. 12	19	6·1	1·159	...	...	6lbs. bran, 5lbs. crushed oats, 3lbs. linseed meal, 14lbs. silage, 10lbs. elephant grass pasture—natural grasses (dry.)
	20	5·7	1·140	1,170	68·97	
Feb. 8	15	6·3	·945	...	...	7lbs. bran, 4lbs. crushed oats, 6lbs. linseed meal, 16lbs. silage. Pasture—natural grasses (dry.)
	20	5·6	1·120	1,050	61·95	
Mar. 20	14	5·4	·756	...	...	7lbs. bran, 2lbs. pollard, 4lbs. crushed oats, 6lbs. linseed meal, 16lbs. silage, 10lbs. elephant grass. Pasture—natural grasses (dry.)
	21½	4·4	·946	1,065	51·06	
April 18	15	5·5	·825	...	...	7lbs bran, 2lbs. pollard, 4lbs. crushed oats, 4lbs. linseed meal, 20lbs. silage, 20lbs. elephant grass. Pasture—natural grasses (dry.)
	20	5·3	1·060	1,225	65·95	
		Av. Test				
Total ...	...	5·21	...	16,675	870·06	Equal to 1,048·26lbs. commercial butter.

HERD TESTING.

THE OFFICIAL AUSTRALIAN PURE BRED DAIRY CATTLE PRODUCTION TESTING SCHEME.

Conducted by Department of Agriculture, Western Australia.

Name of Cow.	Owner.	Breed.	Herd Book No.	Age.		Date of Calving.	No. of Days in Test.	Weight of Milk for Period.	Average Test.	Total Butter Fat.	Weight of Milk Last day of Test.	Sire.
				Yrs.	Mths.			lbs.	%	lbs.	lbs.	
MATURE COWS—STANDARD 350 LBS. BUTTER FAT.												
Picton's Trequean Flirt ...	A. W. Padbury ...	Guernsey...	747	6	1	18–4–27	273	13,452	5·18	697·98	39	Minnamurra's Gay Boy, 113
Daisy 2nd of Garden Hill ...	Walker & Co. ...	Jersey ...	10,629	5	11	29–1–27	273	9,372	5·28	495·22	24	Macaw of Banyule, 1754
Gentle of Blackheath	E. McManus ...	M.S. ...	11,679	7	2	17–11–26	273	11,748	4·10	481·84	31	Flower's Mayfield of Blackheath, 370
Carnation 3rd of Greyleigh ...	do.	do. ...	...	5	4	18–5–27	273	11.500	4·0	459·89	23½	Foch of Greyleigh
Mokine Clove Carnation ...	Walker & Co. ...	Jersey ...	11,796	5	7	7–6–27	240	6,495	6·23	405·00	21	Noble's best of Garden Hill, 1756
Blanche 2nd of Homleigh ...	E. McManus ...	M.S. ...	9,081	8	8	19–5–27	273	10,564	3·71	392·29	16½	Prince of Homeleigh 517
Pride 3rd of Blackheath ...	Sanatorium Farm ...	do. ...	14,419	6	6	11–9–27	273	10,996	3·56	391·98	25½	Eclipse of Blackheath, 974
Treasure 3rd of Homeleigh ...	E. McManus ...	do. ...	14,950	7	0	2–1–27	273	8,026	4·81	386·67	25½	Defender of Homeleigh, 944
Milton's Daisy 2nd	A. W. Padbury ...	Guernsey...	922	6	0	1–8–27	273	7,800	4·93	385·04	15	Wickham Goldraiser, 214
Colleen of Rosewood	Dept. of Agriculture	do. ...	819	5	7	17–8–27	273	7,161	4·93	353·10	12	Archer of Nundorah, 76
Gladness 2nd of Wollongbar ...	do.	do. ...	631	5	10	16–3–27	273	6,264	5·37	336·38	13	Faithful Fido of Wollongbar, 81
Velvet of Wollongbar	do.	do. ...	774	5	6	10–11–26	210	6,480	4·56	295·81	15	Faithful Fido of Wollongbar, 81
Milkmaid 1st of Blackheath ...	H. O. Simms ...	M.S. ...	10,091	8	5	14–12–26	273	6,780	4·31	292·20	20	Flower's Mayfield of Blackheath, 370
Thelma of Blackheath	do.	do. ...	12,847	6	3	10–12–26	273	6,201	4·08	253·01	7	Flower's Mayfield of Blackheath, 370
Oakford Caprice	H. G. Walton ...	Red Poll...	1134AA	6	1	17–11–26	273	4,336	4·29	186·02	15½	Oakford Bloodstone, 416 AA
Mokine Empire Lily 7th ...	T. H. Wilding ...	Jersey ...	11794	6	3	29–11–27	30	1,665	5·14	85·59	55½	Ettie's Chief of Banyule, 1757
COWS OVER 4½ YEARS AND UNDER 5 YEARS—STANDARD 325 LBS. BUTTER FAT.												
Rye Calara of Cross Vale ...	R. H. Rose... ...	Jersey ...	15701	4	10	29–8–27	273	7,107	6·33	450·43	14	Rye Duke of Glen Iris, 1994
Golden Pearl 4th of Wollongbar	Dept. of Agriculture	Guernsey...	863	4	10	2–12–26	273	6,612	5·31	351·16	19	Judge of Wollongbar, 184
Dinah 2nd of Wollongbar ...	do.	do. ...	832	4	11	6–2–27	273	6,516	4·71	307·16	12	Judge of Wollongbar, 184
COWS OVER 4 YEARS AND UNDER 4½ YEARS—STANDARD 300 LBS. BUTTER FAT.												
Fancy of Moorlands	P. Rose	Jersey ...	14343	4	3	9–6–27	240	4,725	5·31	251·25	7	Noble's Advance of Garden Hill 2273
Sunlight of Waterside	Wooroloo Sanatorium	M.S. ...	14724	4	3	22–1–27	273	4,656	4·93	229·64	12	Masher of Mayfield, 1135
Grantara Sadie	H. G. Walton ...	Red Poll...	1233A	4	4	28–8–27	273	4,563	4·29	195·67	6	Victoria Werribee, 516A
COWS OVER 3½ YEARS AND UNDER 4 YEARS—STANDARD 275 LBS. BUTTER FAT.												
Koojan Rosebud...	A. W. Wilson ...	Guernsey...	1260	3	7	15–4–27	273	6,402	5·10	326·47	14	Robin of Nundorah, 417
Virginia 20th of Darbalara ...	W. Burges ...	M.S. ...	14858	3	11	2–8–27	273	7,530	4·26	321·25	10	Expert of Darbalara, 1608
Mokine Empire Lily 8th ...	T. H. Wilding ...	Jersey ...	20916	3	10	19–4–27	273	5,091	6·15	313·18	17	Ettie's Chief of Banyule, 1757
Wooroloo Redwing	Sanatorium Farm...	M.S. ...	NYA	3	8	18–7–27	273	7,737	3·84	299·40	19	Commercial of Blackheath, 2001
Parson's Red Rose 31st of Wollongbar	Dept. of Agriculture	Guernsey...	985	3	11	31–10–26	273	5,589	4·99	278·99	13	Rose Boy of Wollongbar, 315

Betty of Moorlands	P. Rose	Jersey ...	15683	3	11	12–6–27	240	4,665	5·50	256·77	9	Noble's Advance of Garden Hill. 2273
Dover 6th of Kelvin Park ...	Hospital for Insane	M.S. ...	NYA	3	9	14–6–27	273	6,783	3·60	244·57	11	Daddy Xmas of Croobyar, 928
Priscilla 10th of Darbalara ...	W. G. Burges ...	do. ...	14457	3	11	21–9–27	210	4,755	4·66	221·73	7½	Melbourne of Darbalara 1142
Fancy 2nd of Kelvin Park ...	Hospital for Insane	do. ...	NYA	3	9	27–3–27	273	7,303	2·95	215·60	19½	Treasure of Gleneira, 1879
Grantara Pebble	H. G. Walton ...	Red Poll ...	1232A	3	7	15–3–27	273	4,510	4·23	190·84	13½	Victoria Werribee, 516A
Peree's Rye Capture of Grass Vale	R. H. Rose ...	Jersey ...	15699	3	9	3–5–27	120	3,270	5·71	186·78	25	Rye Duke of Glen Iris, 1994
Mokine Fancy 2nd	T. H. Wilding ...	do. ...	19131	3	10	16–8–27	120	3,015	5·0	150·84	23½	Ettie's Chief of Banyule, 1757
Grantara Sadie...	H. G. Walton ...	Red Poll ...	1233A	3	6	20–10–26	273	2,914	4·59	133·85	6½	Victoria Werribee, 516A

COWS OVER 3 YEARS AND UNDER 3½ YEARS—STANDARD 250 LBS. BUTTER FAT.

Koojan Dawn	Dept. of Agriculture	Guernsey...	1252	3	2	19–8–27	293	8,7s2	4·56	400·50	22½	Robin of Nundorah, 417
Wollongbar Dessie 2nd ...	Muresk Agricultural College	do. ...	1121	3	1	30–5–27	273	4,947	5·74	283·97	9	Renown of Wollongbar, 334
Wollongbar Realm 2nd ...	do. do.	do. ...	1151	3	5	17–5–27	273	5,167	5·11	264·35	12½	Bellman of Wollongbar, 334
Duchess 4th of Kelvin Park ...	Hospital for Insane	M.S. ...	NYA	3	5	24–5–27	273	6,840	3·67	251·15	20	Daddy Xmas of Croobyar, 928
Cherry 5th of Kelvin Park ...	do.	do. ...	NYA	3	4	14–2–27	273	5,976	4·16	248·75	17	Daddy Xmas of Croobyar, 928
Jessie of Moorlands	P. Rose	Jersey ...	16858	3	5	28–5–27	273	4,687	4·73	221·89	7½	Vesta 2nd Twylish of Coorah, 1870
Grantara Jacinth	H. G. Walton ...	Red Poll ...	1231A	3	5	19–8–27	273	6,103	3·60	220·12	4½	Victoria Werribee, 516A
Sparkle of Trelawney	Walker & Co. ...	Jersey ...	20914	3	3	10–9–27	150	4,875	4·46	217·81	26	Trelawney, 3426
Koojan Bonnie Princess ...	Dept. of Agriculture	Guernsey...	1251	3	2	21–7–27	240	3,480	5·12	178·32	9	Golden King of Koojan, 369
Wollongbar Modesty 2nd ...	Muresk Agricultural College	do. ...	1134	3	1	17–2–27	273	2,842	5·71	162·46	7½	Bounty of Wollongbar, 336
Mokine Columbine 3rd	T. H. Wilding ...	Jersey ...	19130	3	5	20–8–27	90	2,715	5·42	147·21	30½	Mokine Duke, 3428
Bock of Moorlands	P. Rose	do. ...	17959	3	3	9–8–27	90	2,595	5·4	140·19	25	Noble's Advance of Garden Hill, 2273

HEIFERS OVER 2½ YEARS AND UNDER 3 YEARS—STANDARD 225 LBS. BUTTER FAT.

Koojan Dulcie	A. W. Padbury ...	Guernsey...	1255	2	9	10–1–27	273	5,563	5·97	332·20	19½	Robin of Nundorah, 417
Pansy 5th of the Hill ...	W. G. Burges ...	M.S. ...	NYA	2	6	6–8–27	273	8,131	3·83	311·86	25½	Crescent of the Hill, 2016
Lassie Fowler of Moorlands ...	P. Rose	Jersey ...	17963	2	7	12–5–27	273	5,911	5·22	308·64	7	Grafter of Melrose, 3560
Girlie 4th of Sarnia	F. P. Attwell ...	do. ...	17943	2	10	12–6–27	273	5,889	5·22	307·58	13	Werribee Starbrights Butter King, 2397
Belle 4th of Claremont ...	Hospital for Insane	M.S. ...	NYA	2	8	23–11–26	273	7,470	3·99	298·59	25	Telyarup Prince of Claremont, 2352
Matilda 7th of Berry	W. G. Burges ...	do. ...	14074	2	11	13–1–27	273	6,454	4·12	266·11	21½	Rutland of Darbalara, 575
Lydia of Moorlands	P. Rose	Jersey ...	19107	2	6	27–6–27	240	5,880	4·48	263·54	4½	Top Notch of Roelands, 4011
Lady 1st of Wooroloo	Sanatorium Farm ...	M.S. ...	NYA	2	8	18–6–27	273	6,265	3·96	248·41	13½	Commercial of Blackheath, 2001
Queen of Moorlands	P. Rose	Jersey ...	16860	2	11	12–6–27	273	4,524	5·48	248·30	8	Vesta 2nd Twylish of Coorah, 1870
Spurfield Air Girl 2nd ...	Muresk Agricultural College	Guernsey...	1048	2	8	1–1–27	273	4,396	5·51	242·40	15½	Milton's Stedfast, 292
Dahlia 5th of Berry	W. G. Burges ...	M.S. ...	NYA	2	11	20–1–27	273	5,625	4·26	239·78	15	Mirth of Berry, 1716
Dewdrop 4th of Berry	W. G. Burges ...	do. ...	13434	2	11	6–12–26	273	5,644	4·12	232·60	16½	Newhaven of Darbalara, 1174
Ivy of Moorlands	P. Rose	Jersey ...	19106	2	6	12–8–27	240	4,830	4·62	223·25	10	Grafter of Melrose, 3560
Spurfield Angelica 2nd	Muresk Agricultural College	Guernsey...	1051	2	7	26–6–27	273	3,694	5·44	201·02	11½	Milton's Stedfast, 292
Helen of Moorlands	P. Rose	Jersey ...	17961	2	9	10–7–27	210	3,885	4·84	188·37	7½	Top Notch of Roelands, 4011
Mercedes Sweet Ginger of Glen Iris	A. W. Green ...	do. ...	16679	2	11	13–9–27	150	2,670	5·80	154·86	12	Mercedes Sweet Duke of Glen Iris, 2982
Grantara Rene	H. G. Walton ...	Red Poll ...	1594A	2	9	30–4–27	273	4,041	3·62	146·66	7	Victoria Werribee, 516A
Jessie Lind of Grass Vale ...	R. H. Rose ...	Jersey ...	17965	2	11	4–5–27	120	2,370	5·29	125·37	18	Rye Duke of Glen Iris, 1994

HERD TESTING—*continued.*

Name of Cow.	Owner.	Breed.	Herd Book No.	Age.		Date of Calving.	No. of Days in Test.	Weight of Milk for Period.	Average Test.	Total Butter Fat.	Weight of Milk Last day of Test.	Sire.
				Yrs.	Mths.							
HEIFERS UNDER 2½ YEARS—STANDARD 200 LBS. BUTTER FAT.												
Pinkie 8th of the Hill	W. G. Burges ...	M.S. ...	NYA	2	5	4-8-27	273	8,355	4·40	368·29	25	Crescent of the Hill, 2016
Denmark Anne	Dept. of Agriculture	Guernsey...	1164	2	3	1-6-27	273	6,264	5·31	332·92	18	Linwood of Wollongbar, 381
Denmark Red Rose	do. do.	do. ...	1357	2	0	19-7-27	273	4,897	5·75	282·00	12½	Rose Chief of Wollongbar, 130
Koojan Lady Buller	A. W. Wilson ...	do. ...	1259	2	0	5-7-27	273	5,097	5·16	263·43	14	Robin of Nundorah, 417
Spring Park Starbright ...	A. W. Green ...	Jersey ...	NYA	1	11	27-7-27	273	4,374	5·56	243·37	13	Mercedes Noble Prince of Glen Iris, 3335
Newry Daisy	G. Berryman ...	Guernsey...	1247	2	2	19-7-27	273	4,044	6·01	243·24	8	Sheriff of Koojan, 424
Koojan Dolly	A. W. Wilson ...	do. ...	1254	2	1	7-7-27	273	5,613	4·30	241·41	16	Robin of Nundorah, 417
Tessie of Garden Hill	W. Padbury ...	Jersey ...	17957	2	5	23-2-27	273	3,768	6·37	239·15	11	Cream Socks of Glen Iris, 1410
Princess 6th of Berry	W. G. Burges ...	M.S. ...	NYA	2	2	13-1-27	273	5,636	4·23	238·42	20½	Rutland of Darbalara, 575
Beryl of Moorlands	P. Rose	Jersey ...	20886	2	0	18-7-27	240	4,665	4·83	225·66	8	Grafter of Melrose, 3560
Wollongbar Golden Pearl 5th ...	Muresk Agricultural College	Guernsey...	1128	2	5	16-2-27	273	3,864	5·80	224·46	13	Judge of Wollongbar, 184
May 1st of Wooroloo	Sanatorium Farm	M.S. ...	NYA	1	8	8-4-27	273	5,416	4·12	223·42	15½	Commercial of Blackheath, 2001
Wooroloo Beauty	do.	do. ...	NYA	2	4	20-1-27	273	4,837	4·61	223·38	17½	Commercial of Blackheath, 2001
Hazel of Moorlands	P. Rose	Jersey ...	20891	2	0	4-7-27	240	4,380	5·01	219·54	7	Grafter of Melrose, 3560
Shiela 2nd of Sarnia	F. P. Attwell ...	do. ...	20862	2	3	7-4-27	273	3,478	6·27	218·15	9½	Werribee Starbrights Butter King,
Newry Lass	S. Bevan	Guernsey...	NYA	1	9	12-6-27	273	3,285	6·23	204·82	8½	Sheriff of Koojan, 424 2,307
Audrey of Moorlands	P. Rose	Jersey ...	20883	2	0	19-8-27	210	4,140	4·93	204·24	8½	Colonel of Melrose, 4015
Gem 6th of Garden Hill ...	W. Padbury ...	do. ...	18563	2	0	26-11-26	273	3,091	6·30	192·84	5½	Reality of Garden Hill, 3095
Madrigal 2nd of Warenda ...	A. W. Green ...	do. ...	NYA	1	10	25-9-27	210	3,675	5·23	192·24	17	Kinnor of Banyule, 2727
Dorinda of Moorlands	P. Rose	do. ...	19105	2	5	4-9-27	210	3,960	4·99	187·86	10½	Grafter of Melrose, 3560
Jewel of Moorlands	do.	do. ...	20892	2	1	8-9-27	210	3,675	5·04	185·47	10½	Grafter of Melrose, 3560
Joan of Moorlands	do.	do. ...	20893	1	11	17-8-27	210	3,960	4·61	182·88	6	Grafter of Melrose, 3560
Nan of Claremont	Hospital for Insane	M.S. ...	NYA	2	1	2-11-26	273	4,413	4·14	182·74	16	Norval of Darbalara
Winnie of Claremont	do.	do. ...	NYA	2	4	9-10-26	273	4,354	4·19	182·50	11½	86th Duke of Pentland
Bemil of Moorlands	P. Rose	Jersey ...	20885	2	0	20-9-27	210	4,005	4·49	180·12	9	Colonel of Melrose, 4015
Folly of Moorlands	do.	do. ...	20889	1	11	11-8-27	210	3,555	4·87	173·19	8½	Colonel of Melrose, 4015
Bloom of Moorlands	do.	do. ...	20887	2	2	8-8-27	210	3,360	5·03	169·09	8½	Grafter of Melrose, 3560
Koojan Bonnie Katherine ...	A. W. Padbury ...	Guernsey...	1250	2	2	22-9-27	120	2,805	5·67	159·12	22	Robin of Nundorah, 417
Juliet 2nd of Juadine	Walker & Co. ...	Jersey ...	NYA	2	0	10-9-27	150	3,090	4·93	152·52	16	Fascinator of Garden Hill, 2754
Bud of Moorlands	P. Rose	do. ...	20888	2	0	27-8-27	180	2,940	4·89	143·94	8	Grafter of Melrose, 3560
Rene of Moorlands	do.	do. ...	19108	2	5	11-8-27	90	2,895	4·59	133·05	30	Grafter of Melrose, 3560
Nymphea 2nd of Juadine ...	Walker & Co. ...	do. ...	NYA	2	0	15-8-27	180	2,460	5·36	132·00	11½	Fascinator of Garden Hill, 2754
Gwen of Moorlands	P. Rose.	do. ...	20890	1	10	10-8-27	210	2,400	5·49	131·70	5½	Colonel of Melrose, 4015
Banker's Lady of Trelawney ...	Walker & Co. ...	do. ...	NYA	2	2	6-9-27	150	2,475	5·18	128·37	14	Banker of Garden Hill, 3092
Coquette of the Hill	W. G. Burges ...	M.S. ...	NYA	2	3	22-5-27	180	2,895	3·62	105·03	4½	Crescent of the Hill, 2016
Butter of Moorlands	P. Rose	Jersey ...	19104	2	5	8-9-27	30	1,080	4·65	50·28	36	Colonel of Melrose, 4015
Beauty of Moorlands	do.	do. ...	20884	2	1	13-9-27	30	885	4·55	40·17	29½	Colonel of Melrose, 4015
365 DAYS TEST.												
Picton's Trequean Flirt ...	A. W. Padbury ...	Guernsey...	747	6	1	18-4-27	365	16,675	5·21	870·06	35	Minnramurra's Gay Boy, 113
Daisy 2nd of Garden Hill ...	Walker & Co. ...	Jersey ...	10629	5	11	29-1-27	365	11,240	5·31	597·00	19	Macaw of Banyule, 1754

FRUIT-FLY
(*Ceratitis capitata*).
BAITING AND TRAPPING EXPERIMENTS.

By
L. J. Newman, Entomologist, and Inspector Cahill.

The objects of these experiments were threefold.

1st. To test the relative effectiveness of foliage poison baiting *versus* the trapping or luring method.

2nd. To demonstrate the advantages gained in poisoning or trapping the female fruit-fly before she reaches the egg-laying stage.

3rd. To test the substitution of Arsenate of Soda for Arsenate of Lead as the poison in the foliage bait.

By kind permission of Mr. Ilbury, of Mundaring, his orchard was placed at our disposal in which to make the experiments.

The trials were commenced on February, the 11th, and terminated on March the 9th, a period of 28 days.

The method adopted was as follows:—Six peach trees of the same variety, carrying fruit, were selected. Each of the trees was framed around with timber, over which a stout fly-proof netting was nailed.

The ground beneath the netted trees was also covered with a strong calico.

View of experimental cages as constructed over Peach trees.

The trees were numbered 1 to 6, the 6th being used as the control or check. To make the conditions as natural as possible, a vessel containing water, easily available to the flies was placed in each covered tree.

Trees No. 1, 2, and 5 were foliaged baited. Trees No. 3 and 4 had two traps placed in each, carrying the lure.

Tree No. 6 was not treated in any way other than being covered.

Into each of the trees, 1, 2, 3 and 4, on February 11th, 50 fruit-flies were liberated. Trees 1, 2, were at once baited, traps containing the lure being suspended in Trees 3 and 4. Tree No. 5 was not baited nor flies liberated therein until the 13th.

In Trees No. 1 to 5, the flies consisted of 38 females and 12 males.

In Tree No. 6, control, they were divided into 40 females, *plus* 10 males.

Each day of the experiment the trees were officially visited. Daily records of dead or captured flies and the number of infested fruits found on trees and ground beneath, were carefully made. All infested fruits found, were daily destroyed.

Trees No. 1 and 2 were both treated with the foliage bait, as advised by the Department of Agriculture.

Powdered Arsenate of Lead	2½ ozs.
Molasses	4 lbs.
Juice of 1 doz. Oranges.	
Water to make 4 gallons.	

The ingredients were thoroughly mixed and applied every 7th day per medium of a syringe. Four applications to foliage were made.

Into tree No. 1 50 fruit-flies were introduced consisting of 38 females under the egg-laying stage plus 12 males. In passing, it may be well to explain that the fruit-fly, after emerging from the pupa in the soil, is incapable of laying fertile eggs until she is 10 days old.

Into tree No. 2 the same number of flies were liberated. The difference in the experiment, however, was in the age of the flies.

In this instance the flies had all passed the 10-day stage and were ready for egg-deposition.

Daily records were taken which, when finally added, gave the following interesting and instructive results. Tree No. 1, flies under 10 days old, 12 per cent. of fruit infested with fruit-fly maggots. Tree No. 2, flies over 10 days old, 30 per cent. infested fruit, equalling 2½ times more damaged fruit than tree No. 1.

Now why this disparity in the total loss of fruit, seeing that both trees were treated at the same time with the same bait?

The answer is found in the different ages of the flies submitted. The flies in tree No. 1 had not reached the egg-laying stage. They readily partook of the bait and were mostly poisoned off before they were ready to lay.

This would be the condition in an orchard where the trees were regularly foliage-baited once every seven days, the flies being poisoned off within the ten-day period.

In tree No. 2 the damage was greater, because the flies were ready to lay when submitted, and even though they partook of the bait, many eggs would be deposited in the ripening fruit before death ensued.

This is an illustration of what is likely to happen in an orchard or garden where baiting is not regularly and consistently done.

The secret of success in foliage-baiting depends upon the presence of available bait when the flies issue from the pupae.

They readily partake of the poisoned bait, and are thus destroyed before being capable of damage.

Trees No. 3 and 4—Trapping Experiment.—To test the value of this method as compared with foliage-baiting, trees No. 3 and 4 were in like manner supplied with 50 fruit-flies each. The flies in No. 3 tree were under 10 days old, those in tree No. 4 being ready for egg-laying.

The lure used in the traps was made of the following:—

Pollard 8ozs.; Powdered Borax 8 ozs.; Arsenate of Soda ¼oz. Water to make 1 gallon of liquid.

The ingredients were thoroughly mixed together in the water and allowed to steep for 16 hours.

At the termination of this period, the mixture was again well shaken and allowed to stand.

A clear amber-coloured liquid resulted which was used in the traps. In each of the trees, two bright marginal-edged tins were hung of a capacity of ¾ of a pint. They were suspended about half way up the trees on the North-East and North-West sides.

Into each trap ½ pint of lure was placed, this being renewed every seven days. Like trees No. 1 and 2, these were daily visited and records made of all dead and trapped flies and infested fruits.

The summing up gave the following results:—Tree No. 3, flies under 10 days old when submitted, 5 per cent. infested fruit. Tree No. 4, flies ready to lay when liberated, 18 per cent. infested fruit.

A comparison with trees No. 1 and 2, foliage-baited, reveals that the trapping results are slightly better. It is also a further demonstration of the advantage of capturing the female flies before the egg-laying stage is reached.

Covered trees as viewed from different aspect.

Tree No. 5. This was used as an experiment to test the possible substitution of arsenate of soda for arsenate of lead.

The object of the test being to find a more rapid poisoning medium than at present being used in the foliage bait. Various strengths from ¼oz. of arsenate of soda down to one-thirtysecond of an oz. were tried.

The results were excellent from the point of view of destroying the flies. Unfortunately, at even as low a strength as one-thirtysecond of an oz. to the gallon, the leaves and young wood of the trees were burned. This experiment was therefore abandoned.

The spray containing ¼oz. of arsenate to the gallon could be very effectively used on gum leaves or other foliage suspended in the centre of the fruit tree.

Care would need to be taken to see that fruit was not brought into contact with the poison.

Tree No. 6. Control or check tree. This was of the same variety as the others, and in every respect received the same treatment, with the exception that foliage bait or traps were not used.

Except for the fact that the flies were confined to the tree, they were in no way molested.

Daily observations were made, all infested fruits being picked from tree and ground and recorded.

The final results revealed the enormous loss of 89 per cent. of the fruit, definitely proving what a destructive pest the fruit-fly is when left to work its own sweet will.

Tabulated records appended.

TABLE SHOWING RESULTS OF THE FIVE EXPERIMENTS, COMPARED WITH THE CONTROL OR CHECK.

Date Commenced.	Date terminated.	Total period.	Tree No.	Species of Fruit.	Method of treatment.	No. of treatments.	No. of flies liberated.	Conditions of flies.	Sound Fruits. %	Unsound Fruits. %	Bait or lure used.
1928.											
Feb. 11 ...	9-3-28	28 days	1	Peach	Foliage baiting	Four	50	38 females under egg laying stage; 12 males	88	12	2½ oz. powdered arsenate of lead; molasses, 4lbs.; juice of 1 doz. oranges; water. 4 gallons.
Feb. 11 ...	9-3-28	28 „	2	do.	do.	do.	50	38 females ready for egg deposition; 12 males	70	30	do. do.
Feb. 11 ...	9-3-28	28 „	3	do.	Trapping or luring	do.	50	38 females under egg laying stage; 12 males	95	5	Two traps baited with the following—pollard, 8 ozs. powdered borax, 8 ozs.; arsenate of soda, ¼ oz; water, 1 gal.
Feb. 11 ...	9-3-28	28 „	4	do.	do.	do.	50	38 females ready for egg deposition; 12 males	82	18	do. do.
Feb. 13 ...	9-3-28	26 „	5	do	Foliage baiting	do.	50	38 females under egg laying stage	99	1	In this bait, arsenate of soda was substituted for arsenate of lead. It was used at the rate of ¼ oz., ⅛, 1/16 and 1/32 of an oz. to the gal. Abandoned on account of foliage and fruit burn.
Feb. 11 ...	9-3-28	28 „	6	do.	Control no treatment	...	50	20 females under egg laying age; 20 females ready for egg deposition; 10 males	11	89	No treatment.

A summary of the results of the experiments show that foliage-baiting, when used correctly, does effectively control this pest.

That trapping or luring gave a 7 per cent. better result than foliage baiting.

The need for regular and consistent baiting or trapping is emphasised in the better results recorded in trees No. 1 and 3, as compared with trees No. 2 and 4.

It was also demonstrated that arsenate of soda was readily partaken of by the fruit-fly when incorporated with a sweetened fruit juice.

That arsenate of soda was a rapid killer, destroying many flies within 60 minutes of being applied.

That owing to foliage and fruit burning, arsenate of soda is not recommended as a fruit tree spray.

Tree No. 6 control is a striking illustration of what happens when no effort is made to control fruit-fly.

Table of comparisons.—For this purpose trees No. 1 and 3 will be compared with the control tree No. 6. Trees No. 3 and 4 represent conditions unfavourable to good control.

Tree No. 1.—Foliage-baited, 4 times. 88 per cent. clean fruit.

Tree No. 3.—Trapping or luring renewed 4 times. 95 per cent. clean fruit.

Tree No. 6.—Control, untreated, 11 per cent. clean fruit.

The above figures speak for themselves and prove that both foliage-baiting or trapping, as advised by the department, are effective means to use in our efforts to control this most serious fruit pest.

Trapping being shown by our experiments to be more effective than foliage-baiting, the question resolves itself into one of economics.

The comparative costs of the two methods must be considered.

The difference in favour of the trapping method is 7 per cent. extra sound fruit.

Foliage-baiting is done in half the time that it takes to tend, clean and renew the lure in the traps.

The conclusion therefore arrived at is that, in large areas the extra time and labour employed in the trapping method and the consequent increased cost, would more than offset the value of the 7 per cent. of fruit saved.

In small orchards and home gardens we consider the application of the trapping or luring methods the most effective.

Throughout these tests complete sanitation was carried out, all infested fruits being gathered from trees and ground daily.

RESULTS OF FIRST EGG-LAYING COMPETITION HELD AT MURESK AGRICULTURAL COLLEGE.

W. T. Richardson,
Poultry Adviser.

The test commenced on 10th April, 1927, and terminated on 31st March, 1928, a period of 357 days.

The competition was controlled by a Committee of Management consisting of the College Principal (Mr. H. J. Hughes), a competitors' representative (Mr. R. B. Aiken) and the Poultry Adviser (Mr. W. T. Richardson).

Two sections were provided, *i.e.*—

Section "A": Light Breeds—

72 White Leghorns.

Section "B": Heavy Breeds—

81 Black Orpingtons.
6 Rhode Island Reds.

Total number of birds entered .. 159

In each section the competition was decided by the highest number of units obtained by each group of three birds, and by each individual bird in their respective sections.

A first grade egg was rated as one unit and a second grade egg as three-quarters of a unit.

During the first two months of the Competition, a first grade egg to weigh not less than 1¾ ozs., thereafter during the remainder of the Competition a first grade egg to weigh not less than 2 ozs.

The minimum weight of a second grade egg was 1½ ozs.

All birds were single pen tested and the actual weight of every egg laid was recorded.

The following were ineligible for prizes, under Regulation "S," owing to the eggs not attaining an average of 24 ozs. to the dozen during the week ending July 9th:—

GROUP PENS (3 Birds).

Section "A"—Light Breeds.

J. W. Davey	Birds Nos.	13, 14, 15
J. J. Jackson	„	34, 35, 36
J. McAllister	„	40, 41, 42
O. J. Patridge	„	52, 53, 54
S. J. Hanna	„	73, 74, 75

Section "B"—Heavy Breeds.

Yaldarra Poultry Farm	Birds Nos.	1, 2, 3
Durham & Hoops	„	13, 14, 15
S. J. Hanna	„	25, 26, 27
N. McDonald	„	37, 38, 39
F. B. Pepper	„	49, 50, 51
H. Spence	„	67, 68, 69
W. Youd	„	79, 80, 81
J. W. Balsdon	„	82, 83, 84
T. Parkinson	„	85, 86, 87

INDIVIDUAL BIRDS

SECTION "A"—LIGHT BREEDS.

T. Boulter	Bird No. 8
G. Davey	„ 10, 11
J. W. Davey	„ 13, 14
J. B. Haagensen	„ 30
J. J. Jackson	„ 34, 35
J. McAllister	„ 42
Neavedale Poultry Farm	„ 45
O. J. Patridge	„ 52, 54
J. W. Russell	„ 63
H. Swanson	„ 64
Walker & Co.	„ 68
S. J. Hanna	„ 73, 74

SECTION "B"—HEAVY BREEDS.

Yaldarra Poultry Farm	Birds Nos. 1, 2
H. Childe	„ 4
A. Collins	„ 8
G. Davey	„ 11
Durham & Hoops	„ 14, 15
R. A. Dusting	„ 16
S. J. Hanna	„ 25, 26, 27
A. F. Lethbridge	„ 31, 32
M. Love	„ 34
N. McDonald	„ 38, 39
Neavedale Poultry Farm	„ 41, 44
T. Parkinson	„ 46
F. B. Pepper	„ 50, 51
D. F. Robinson	„ 61
H. Spence	„ 67, 68, 69
J. Teesdale	„ 72
G. S. Thompson	„ 74, 75
W. Youd	„ 80, 81
J. W. Balsdon	„ 82, 83, 84
T. Parkinson	„ 85, 86

PRIZE LIST.

CHAMPION CERTIFICATE FOR BEST GROUP RECORD IN COMPETITION.

Awarded to M. LOVE (Hens Nos. 34, 35 and 36 (Black Orpingtons).

1st Grade ... 471
2nd Grade ... 290 } 761 Eggs = 689¼ units.

LEADING GROUP PENS.

SECTION "A"—LIGHT BREEDS.

(*a*) J. J. JACKSON (Hens Nos. 34, 35, and 36).

1st Grade ... 370
2nd Grade ... 410 } 780 Eggs = 677½ units.

YALDARRA POULTRY FARM (Hens Nos, 1, 2 and 3).

1st Grade ... 513
2nd Grade ... 201 } 714 Eggs = 663¾ units.

*First Prize, £3 3s.

WALKER & CO. (Hens Nos. 67, 68 and 69).

1st Grade ... 555
2nd Grade ... 129 } 684 Eggs = 651¾ units.

*Second Prize, £2 2s.

* Donated by the late Sir Alfred Langler. (*a*) Ineligible for prizes under Reg. 5.

SECTION "B"—HEAVY BREEDS.

M. LOVE (Hens Nos. 34, 35 and 36).
1st Grade ... 471
2nd Grade ... 290
761 Eggs = 689¼ units.
*First Prize £3 3s.

T. PARKINSON (Hens Nos. 46, 47 and 48).
1st Grade ... 581
2nd Grade ... 106
687 Eggs = 660½ units
*Second Prize, £2 2s.

NEAVEDALE POULTRY FARM (Hens Nos. 43, 44 and 45)
1st Grade ... 571
2nd Grade ... 99
670 Eggs = 645¼ units.

* Donated by the late Sir Alfred Langler.

LEADING INDIVIDUAL HENS.

SECTION "A"—LIGHT BREEDS.

J. J. JACKSON (Hen No. 36).
1st Grade ... 253
2nd Grade ... 5
258 Eggs = 256¾ units.
Prize, £1 1s.

YALDARRA POULTRY FARM (Hen No. 3).
1st Grade ... 184
2nd Grade ... 82
266 Eggs = 245½ units.

J. MCALLISTER (Hen No. 41).
1st Grade ... 228
2nd Grade ... 18
246 Eggs = 241½ units.

SECTION "B"—HEAVY BREEDS.

M. LOVE (Hen No. 35).
1st Grade ... 239
2nd Grade ... 15
254 Eggs = 251 units.
Prize, £1 1s.

G. S. THOMPSON (Hen No. 73).
1st Grade ... 246
2nd Grade ... —
246 Eggs = 246 units.

T. PARKINSON (Hen No. 46).
1st Grade ... 208
2nd Grade ... 50
258 Eggs = 245½ units.

WINTER TEST FOR HIGHEST TOTAL OF UNITS DURING PERIOD 10TH APRIL—9TH JULY.

GROUP PENS.

SECTION "A"—LIGHT BREEDS.

T. BOULTER (Hens Nos. 7. 8, and 9)—179¼ units.
Prize, £1 1s.

SECTION "B"—HEAVY BREEDS.

PELVAURM POULTRY FARM (Hens Nos. 22, 23 and 24)—211½ units.
Prize, £1 1s.

FINAL DETAILED RESULTS.

SECTION "A"—LIGHT BREEDS—ALL WHITE LEGHORNS.

Competitor.	Hen No.	No. of Eggs laid.			Total Units.		No. of Eggs, 2 oz. and over.	Remarks.
		1st Grade.	2nd Grade.	Total Eggs.	Individual.	Group.		
Yaldarra, P. F. ...	1	132	117	249	219¾	...	120	
	2	197	2	199	198½	...	197	
	3	184	82	266	245½	663¾	168	
Crombie P. ...	4	124	21	145	139¾	...	101	Died 28–2–28.
	5	225	22	247	241½	...	214	P. Certificate.
	6	116	116	232	203	584¼	99	
Boulter, T.	7	176	5	181	179¾	...	146	Died 11–12–27
	8	140	83	223	202¼	...	95	
	9	202	2	204	203½	585½	193	
Davey, G.	10	68	190	258	210½	...	38	
	11	109	96	205	181	...	90	
	12	180	9	189	186¾	578¼	161	
Davey, J. W. ...	13	29	159	188	148¼	...	12	
	14	99	76	175	156	...	64	Died 11–12–27.
	15	101	140	241	206	510¼	74	
Durham & Hoops ...	16	187	1	188	187¾	...	184	
	17	209	...	209	209	...	206	P. Certificate.
	18	128	47	175	163½	560	105	
Pelvaurm, P. F ...	22	212	2	214	213½	...	200	P. Certificate.
	23	167	2	169	168¼	...	161	
	24	220	2	222	221¾	603½	203	P. Certificate.
Balsdon, J. W. ...	25	142	105	247	220¾	...	112	
	26	93	7	100	98¼	...	79	
	27	87	45	132	120¾	439¾	78	Died 11–12–27.
Haagensen, J. B. ...	28	125	106	231	204¼	...	99	
	29	172	...	172	172	...	166	Died 11–12–27.
	30	77	154	231	192¼	569	60	
Hepburn, A ...	31	129	11	140	137¼	...	129	
	32	233	3	236	235½	...	217	P. Certificate
	33	161	8	169	167	539½	153	
Jackson, J. J ...	34	92	156	248	209	...	66	
	35	25	249	274	211¾	...	3	
	36	253	5	258	256¾	677½	234	P. Certificate.
Love, M.	37	134	36	170	161	...	116	Died 11–12–27.
	38	219	15	234	230½	...	211	P. Certificate.
	39	177	5	182	180¾	572	152	Died 11–12–27.
McAllister, J. ...	40	186	33	219	210¾	...	157	
	41	228	18	246	241½	...	208	P. Certificate.
	42	25	224	249	193	644¼	25	
Neavedale, P. F. ...	43	224	1	225	224½	...	210	P. Certificate.
	44	185	5	190	188¾	...	174	
	45	84	114	198	169½	583	66	
Neavedale, P F. ...	46	138	17	155	150¾	...	120	
	47	167	62	229	213¾	...	145	
	48	210	29	239	231¾	596	195	
Parkinson, T ...	49	162	...	162	162	...	162	15–7–27, Replaced dead bird.
	50	235	5	240	238½	...	229	P. Certificate.
	51	211	11	222	219¼	620	202	P. Certificate.
Partridge, O. J. ...	52	15	172	187	144	...	15	
	53	32	179	211	166¼	...	32	
	54	40	228	268	211	521¼	24	
Priestley, J. ...	55	178	1	179	178¾	...	166	
	56	174	10	184	181½	...	166	
	57	200	...	200	200	560¼	188	
Balgay, P. F.- ...	58	184	3	187	186¾	...	179	
	59	169	2	171	170½	...	163	Died 11–12–27.
	60	228	6	234	232½	589¼	214	P. Certificate.
Russell J. W. ...	61	200	7	207	205¼	...	178	
	62	164	83	247	226½	...	149	
	63	36	44	80	69	500½	36	
Swanson, H. ...	64	65	160	225	185	...	58	
	65	147	20	167	162	...	124	
	66	194	1	195	194¾	541¾	188	
Walker & Co ...	67	179	37	216	206¾	...	156	
	68	153	82	235	214½	...	122	
	69	223	10	233	230½	651¼	212	P. Certificate.
Parkinson, T. ...	70	224	...	224	224	...	222	P. Certificate.
	71	192	3	195	194¼	...	184	
	72	189	...	189	189	607½	188	
Hanna, S. J. ...	73	109	140	249	214	...	83	
	74	123	73	196	177¾	...	119	
	75	163	4	167	166	557¼	163	

SECTION "B"—HEAVY BREEDS.

All Black Orpingtons except pens 19, 20 and 21 and 55, 56 and 57, Rhode Island Reds.

Competitor.	Hen No.	No. of Eggs Laid. 1st Grade.	2nd Grade.	Total Eggs.	Total Units. Individual	Group.	No of Eggs, oz. and over.	Remarks.
Yaldarra, P. F. ...	1	127	72	199	181	...	97	
	2	117	148	265	228	...	90	
	3	175	14	189	185½	594½	156	Died 11-12-27.
Childe, H.	4	39	57	96	81¾	...	22	Died 16-11-27.
	5	199	38	237	227½	...	186	
	6	161	5	166	164¾	474	159	
Collins, A	7	54	11	65	62¼	...	33	Died 11-12-27.
	8	53	28	81	74	...	28	Died 11-12-27.
	9	132	69	201	183½	320	91	Died 11-12-27.
Davey, G.	10	165	9	174	171¾	...	148	Died 11-12-27.
	11	71	106	177	150½	...	36	Died 11-12-27.
	12	201	45	246	234¾	557	171	
Durham & Hoops ...	13	217	2	219	218½	...	212	P. Certificate.
	14	14	258	272	207½	...	7	
	15	23	157	180	140¾	566½	3	
Dusting, R. A. ...	16	156	117	273	243¾	...	128	
	17	198	20	218	213	...	177	
	18	183	5	188	186¾	643½	183	
Pelvaurm, P. F. ...	19	170	20	190	185	...	168	
	20	207	33	240	231¾	...	205	P. Certificate.
	21	172	15	187	183¼	600	172	
Pelvaurm, P. F. ...	22	183	11	194	191¼	...	171	Died 11-12-27
	23	172	54	226	212½	...	135	
	24	157	3	160	159½	568	131	Died 11-12-27.
Hanna, S. J. ...	25	105	165	270	228¾	...	74	
	26	31	175	206	162½	...	13	
	27	36	237	273	213¾	604¾	22	
Jordan, R.	28	121	...	121	121	...	120	Died 11-12-27.
	29	193	52	245	232	...	171	
	30	207	3	210	209½	562½	203	P. Certificate.
Lethridge, A. F. ...	31	152	95	247	223½	...	115	
	32	66	172	238	195	...	34	
	33	143	20	163	158	576¼	127	Died 11-12-27.
Love, M.	34	35	239	274	214¼	...	...	Died 21-2-28.
	35	239	15	254	251	...	220	P. Certificate.
	36	197	36	233	224	689½	189	
McDonald, N. ...	37	219	10	229	226½	...	209	P. Certificate.
	38	119	99	218	193½	...	103	
	39	14	239	253	193¾	613	4	
Neavedale, P. F. ...	40	136	26	162	155¼	...	99	Died 11-12-27.
	41	85	138	223	188½	...	48	
	42	213	...	213	213	557	207	P. Certificate.
Neavedale, P. F. ...	43	209	26	235	228½	...	173	
	44	157	71	228	210¼	...	154	
	45	205	2	207	206¾	645¼	195	
Parkinson, T. ...	46	208	50	258	245½	...	167	
	47	220	14	234	230½	...	202	P. Certificate.
	48	153	42	195	184½	660¾	127	
Pepper, F. B. ...	49	84	80	164	144	...	84	
	50	139	104	243	217	...	124	
	51	183	35	218	209½	570½	171	
Riddell, G. C. ...	52	220	4	224	223	...	200	P. Certificate.
	53	147	2	149	148½	...	138	
	54	243	...	243	243	614½	238	P. Certificate.
Balgay, P. F. ...	55	94	78	172	152½	...	75	
	56	227	3	230	229½	...	212	P. Certificate.
	57	179	11	190	187½	569	175	
Balgay, P. F. ...	58	168	1	169	168¾	...	165	
	59	218	1	219	218¾	...	213	P. Certificate.
	60	195	9	204	201¾	589¼	169	
Robinson, D. F. ...	61	150	17	167	162¾	...	117	Died 11-12-27.
	62	172	12	184	181	...	167	
	63	205	11	216	213½	557	194	
Russell, J. W. ...	64	229	3	232	231¼	...	223	P. Certificate.
	65	183	8	191	189	...	176	
	66	172	5	177	175¾	596	155	
Spence, H.	67	97	157	254	214¾	...	62	
	68	124	154	278	239¼	...	85	
	69	80	90	170	147½	601¾	50	Died 11-12-27.
Teesdale, J. ...	70	201	58	259	244½	...	178	
	71	102	76	178	159	...	68	
	72	157	59	216	201¼	604¾	118	
Thompson, G. S. ...	73	246	...	246	246	...	237	P. Certificate.
	74	89	150	239	201½	...	84	
	75	136	27	163	156¼	603¾	115	Died 11-12-27.
Vernon, A. E. ...	76	168	77	245	226¾	...	131	
	77	94	154	248	209½	...	88	
	78	197	6	203	201½	637¾	191	
Youd, W.	79	196	47	243	231½	...	161	
	80	26	146	172	135½	...	15	
	81	148	85	233	211¾	578½	111	
Balsdon, J. W. ...	82	124	90	214	191½	...	92	
	83	100	171	271	228½	...	67	
	84	81	192	273	225	644¾	43	
Parkinson, T. ...	85	21	161	182	141¾	...	1	
	86	35	197	232	182¾	...	12	
	87	166	19	185	180¼	504¾	143	

Production certificates, awarded by the Department of Agriculture, for birds laying not less than 200 eggs, 2 ozs. and over, were issued to—

14 hens in Section "A," Light breeds;

13 hens in Section "B," Heavy breeds;

as per marginal notes shown against individual scores.

DEATHS DURING THE TERM OF THE COMPETITION.

Bird No.	Breed.	Owner.	Date.	Cause.
49	W.L.	Parkinson, T.	15–7–27	Cystic tumour.
4	W.L.	Crombie, P.	28–2–28	Diphtheric roup (destroyed)
7	W.L.	Boulter, T.	11–12–27	Heat apoplexy
14	W.L.	Davey, J. W.	11–12–27	do.
27	W.L.	Balsdon, J. W. ...	11–12–27	do.
29	W.L.	Haagensen, J. B. ...	11–12–27	do
37, 39	W.L.	Love, M.	11–12–27	do.
59	W.L.	Balgay, P. F.	11–12–27	do.
4	B.O.	Childe, H.	16–11–27	Internal haemorrhage
3	B.O.	Yaldarra P. F.	11–12–27	Heat apoplexy
7, 8, 9	B.O.	Collins, A.	11–12–27	do.
10, 11	B.O.	Davey, G.	11–12–27	do.
22, 24	B.O.	Pelvaurm P. F.	11–12–27	do.
28	B.O.	Jordan, R.	11–12–27	do.
33	B.O.	Lethbridge, A. F. ...	11–12–27	do.
40	B.O.	Neavedale, P. F. ...	11–12–27	do.
61	B.O.	Robinson, D. F. ...	11–12–27	do.
69	B.O.	Spence, H.	11–12–27	do.
75	B.O.	Thompson, G. S. ...	11–12–27	do.
34	B.O.	Love, M.	21–2–28	Internal haemorrhage.

The general health of the birds throughout the Competition was highly satisfactory and they completed the test in good working condition.

The severe heat wave experienced on 11th December, 1927, was general and was responsible for record losses to poultry farmers generally.

The following Birds laid 2oz. eggs and over within one month of commencement of competition:—

SECTION "A."—LIGHT BREEDS.

Hen No.	Owner.	Eggs.	Hen No.	Owner.	Eggs.
1	Yaldarra P. F. ...	1	39	Love, M.	2
3	Do. ...	3	43	Neavedale P. F. ...	7
5	Crombie P. ...	4	46	Do. ...	1
9	Boulter, T. ...	9	48	Do. ...	1
12	Davey, G.	4	49	Do. ...	5
16	Durham & Hoops	5	50	Parkinson, T. ...	10
17	Do. ...	6	51	Do. ...	8
22	Pelvaurm P. F. ...	1	57	Priestley, J. ...	7
23	Do. ...	7	58	Balgay P. F. ...	6
24	Do. ...	1	59	Do. ...	11
26	Balsdon, J. W. ...	5	60	Do. ...	2
28	Haagensen, J. B. ...	4	62	Russell, J. W. ...	2
29	Do.	12	66	Swanson, H. ...	8
31	Hepburn, A. ...	3	67	Walker & Co. ...	3
32	Do. ...	4	69	Do. ...	13
33	Do. ...	10	70	Parkinson, T. ...	15
36	Jackson, J. J. ...	5	71	Do. ...	9
37	Love, M.	1	72	Do. ...	13
38	Do.	7			

SECTION "B."—HEAVY BREEDS.

Hen. No.	Owner.	Eggs.	Hen No.	Owner.	Eggs.
3	Yaldarra P. F. ...	3	48	Parkinson, T. ...	2
5	Childe, H.	4	50	Pepper, F. B. ...	5
7	Collins, A.	3	51	Do. ...	2
10	Davey, G.	7	52	Riddell, G. C. ...	9
22	Pelvaurm P. F. ...	4	54	Do. ...	16
23	Do. ...	1	55*	Balgay P. F. ...	4
24	Do. ...	5	56*	Do. ...	2
29	Jordan, R. ...	6	58	Do. ...	1
30	Do. ...	20	59	Do. ...	17
33	Lethbridge, A. F....	7	60	Do. ...	2
35	Love, M.	2	64	Russell, J. W. ...	6
36	Do. ...	4	66	Do. ...	2
37	McDonald, N. ...	10	70	Teesdale, J. ...	3
42	Neavedale P. F. ...	16	73	Thompson, G. S. ...	2
45	Do. ...	11	75	Do. ...	1
46	Parkinson, T. ...	2	78	Vernon, A. E. ...	1
47	Do. ...	3	87	Parkinson, T. ...	2

* Rhode Island Reds.

TEST AVERAGES.

Eggs 1½ozs. and over.

——	April.	May.	June.	July.	August.	Sept.
"A."—Light Breeds ...	10.11	15.75	14.44	16.19	19.88	21.77
"B."—Heavy Breeds ...	10.22	18.95	20.73	20.72	22.33	22.59
For Competition	10.16	17.35	17.58	18.45	21.10	22.18
——	October.	Nov.	Dec.	January	Feb.	March.
"A."—Light Breeds ...	23.55	21.82	19.84	18.27	17.42	14.06
"B."—Heavy Breeds ...	22.66	18.64	15.61	18.33	15.14	15.25
For Competition	23.10	20.23	17.72	18.30	16.28	14.65

Section Averages— Per Bird.

Section "A."—Light Breeds 210.8

Section "B."—Heavy Breeds 221.6

For Competition 216.5

FOODSTUFFS CONSUMED.

		£	s.	d.
Wheat	144 bus. at 5/6 per bus.	39	12	0
Pollard	155½ bus. at £9 per ton	14	0	0
Bran	79½ bus. at £8 per ton	6	7	0
Meat Meal ...	8 cwt. at £1 0s. 6d. per cwt. ...	8	4	0
Bonemeal ...	2cwt. 3qrs. 0lbs. at £1 1s. 6d. per cwt.	2	19	1
Shell Grit ...	10cwt. 1qr. 0lb. at 4s. 10½d. per cwt. ...	2	9	11
Epsom Salts ...	40lbs. at 17s. per cwt.	0	6	1
Tobacco Dust ...	3lbs. at 4d. per lb.	0	1	0
Charcoal ...	on premises	...		
Green Feed ...	Average 3cwt. per week	...		
		£73	19	1

Consumed by—

159 birds in 8 months

135 birds in 4 months

Average 151 birds in 12 months = 9/9½ per bird per year or 2¼d. per bird per week.

AVERAGE WHOLESALE PRICE OF EGGS.

	1927.					
Month ...	April.	May.	June	July.	August.	Sept.
Per dozen ...	s. d. 2 6	s. d. 2 11	s. d. 2 7½	s. d. 1 10	s. d. 1 3½	s. d. 1 3½

	1927.			1928.		
Month ...	October.	November.	December.	January.	February.	March.
Per dozen ...	s. d. 1 3¾	s. d. 1 4¾	s. d. 1 4	s. d. 1 6½	s. d. 1 11½	s. d. 2 4½

Average for period of Competition—1s. 10¼d. per dozen.

	Foodstuffs Fed, their Value and Ratio.								Ash.
	Protein.		Carbohydrates.		Fats and Oils.				
	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.
Wheat	8,640	11·37	982·36	72·5	6,264·0	2·93	253·15	1·52	131·32
Pollard	3,110	12·66	393·72	68·62	2,134·08	3·50	108·85	1·86	57·84
Bran	1,590	14·33	227·84	62·41	992·31	4·64	73·77	3·63	57·71
Meat Meal (Wyndham)	896	70·0	627·20	...	...	14·86	133·14	5·57	49·90
Bonemeal (M.I.B.)	308	24·3	74·84	3·6	11·08	3·10	9·54	61·70	190·03
	14,544	...	2,305·96	...	9,401·47	...	578·45	...	486·80

RATIO:

$$578{\cdot}45 \times 2{\cdot}25 = 1{,}301{\cdot}51 + 9{,}401{\cdot}47 \quad 10{,}702{\cdot}98$$

$$2{,}305{\cdot}96$$

1 to 4·64.

THE GRADING AND MARKETING OF POTATOES.

W. E. COLLINS,
Potato Inspector.

The business of marketing his potatoes is always uppermost in the mind of the grower, but the average grower has not yet risen to the same plane as our best fruit packers.

On any market day one may witness cases of fruit being passed over the rollers for sale, and where a product of a packer of repute is submitted there is no close inspection, the buyers not even rising from their seats, being properly satisfied that the quality and grade are there; but none the less the bidding quickly soars above the average rates ruling.

The grading of potatoes is quite as important as the grading of fruit.

Putting good potatoes on the top of the bag is an old trick, and it is still common practice to put good ones in the bottom—this to fool the buyer if he opened the bottom instead of the top of the bag. The merchants and dealers get around this by slitting the centre of the bag from top to bottom, so exposing the whole of the contents to view.

Every kind of deception in marketing is poor business, and sooner or later rebounds on those who practice it.

Now that growers have formed associations, potatoes should be graded and marketed under a brand insuring quality. This would in short time cause potatoes carrying this brand to command a premium.

The old excuses that there is little time to grade at harvesting periods, that growers are more or less in the hands of contract diggers, or that it involves too much handling, are not acceptable to the merchants.

It is generally known that the employer of labour in potato work finds it hard to get men to be careful in grading, no matter how strict the instructions, but the merchants still consider the onus is on the grower to send forward well graded samples.

It may not be good business on the part of the average purchasers of supplies for the household, but it is nevertheless true that 75 per cent. of the potatoes consumed by city and town people pass over the counters of the retail storekeepers in stone and half-stone lots.

When one considers that truck-lots have to be broken down to this degree, it is not to be wondered at that merchants require well graded potatoes to give satisfaction and to avoid loss.

How is this grading to be accomplished with a minimum of trouble and expense?

The writer is of the opinion that grading could be carried out simultaneously with the digging.

Experience has taught that the bugbear of digging is the picking up, and if the digger has to go over the ground twice—which he has to do if two grades are to be made—this constitutes to him a double evil, and the majority resort to all manner of subterfuge to evade it.

What grower is there who has not, when having his crop dug, seen careless and indifferent diggers mar his sample by placing in the bags culls and "pig" potatoes? The digger would much rather take less per bag and have one "pick up" only.

If this be so, the difference in the price of digging with one "pick up" only and that of making two grades, would more than pay for the grading.

For instance, we will take an average crop and set nine men to dig. The crop in the ordinary way of digging and the making of two grades is worth, say, 2s. per bag. Growers will find in nearly every instance, that diggers are willing to dig this same crop at 1s. 9d. (possibly less), providing they may make only one "pick up."

Assuming they dig 15 bags per man, or a total of 135 bags for the day, this would mean a saving of £1 13s. 9d.—more than enough to pay for the grading.

The grader or screen—a home-made affair, or one of those to be purchased on the market—would follow three diggers at the time. Taking the centre row, with the rows right and left, the graders would leave the marketable potatoes graded and sewn up in the one row ready for carting, with the culls and pig potatoes put on one side to be further dealt with. On working up close to the first three diggers they would drop back to the next three men, and so on to the next three.

Following the digging in this style throughout the day, it should be quite possible and reasonable for two good men to sew, tally, and grade behind nine diggers in an average crop.

An extension or modification of this plan to suit acreage, crop, etc., would certainly overcome the trouble of grading, to the mutual satisfaction of both grower and merchant.

Replying to the query that will arise as to what shall be done with the waste, these may be re-graded, but only the very best should be retained for possible "round seed" orders, and the balance fed to stock.

It is more profitable to the grower to send forward 4½ tons of graded potatoes than it is to send a 5-ton truck in which there are distributed the extra eight bags of small and inferior potatoes. In the first instance the grower receives the full current market rate, say, £8 per ton, or £36 for his 4½ tons.

In the latter instance there is every chance of the merchant refusing to take delivery. This truck is then auctioned, and in most cases realises £2 per ton less, or £30 only for the five tons. A clear loss of £6 plus eight bags of possible round seed.

Again, should the consignment escape this and be taken into store, the inspectors of the Potato Branch may be called in to adjudicate and assess the wastage from a pick-over, entailing much loss to the grower and no little inconvenience to the merchant.

This is all very unsatisfactory to the industry, and every effort should be made to remedy it. It is at this juncture, when merchants are surfeited with badly graded local potatoes, they turn to the Eastern States and import.

It is to be remembered the market is never too full for good graded lines. Even in glut season with low prices ruling, there is always a ready sale for prime produce. It is the inferior lines that fill and drug the market.

Another point favourable to marketing, and one that cannot be too strongly stressed, is the use of clean, sound bags. Merchants object to their products being contained in unwashed salt and sugar bags. They state that potatoes do not keep well in these, and that it gives them a most unwholesome appearance. Bags, too, should be sound and well sewn if the grower would avoid considerable losses in weight. It is known that potatoes are paid for on weighbridge weights, but it is not so generally known that, firstly, the potatoes have to be discharged from the trucks on to lorries and then taken to the weighbridge for weighing purposes. During the process it is no uncommon sight to witness weakly bags being broken and the contents spilled on the floor of the wagon and on to the ground, there to be trodden on and wasted—a distinct loss to the grower.

Greening of tubers by exposure is another contributing factor to lowering the market value of potatoes, sufficient care not being taken in the selection of good stout bags, with tightly sewn mouths, and removal to a covered place immediately after digging. The spectacle of gaping bags, with the contents greened at the mouths, is of common occurrence, and it is not rare to see the whole of the tubers "greened up" when such has been left standing in the paddocks for a week or so with the covering of chaff-bag consistency.

FRUIT FLY.

(*Ceratitis capitata.*)

TRAPPING OR LURING METHODS.

L. J. NEWMAN, F.E.S.,
Entomologist.

Since the discovery made in Western Australia that kerosene oil had a most remarkable chemotropic reaction on the male of *Ceratitis capitata*, work of a similar nature, against various species of fruit flies in other countries, has been undertaken by entomologists. This has demonstrated that different species of fruit fly show a reaction to various chemical odours. The Queensland fruit fly, for instance, is so affected by citronella oil, but is indifferent to kerosene oil.

The scope of this line of research is gradually widening and its application to other insects and animals is being tested with promising results.

Geraniol, a product of geranium, is being very successfully used in America against the introduced Japanese beetle (*Popillia Japonica*), a pest which has spread rapidly in that country and caused great economic loss. Tests are at present being carried out in various countries with fermented apple juice as a lure for the Codlin Moth. Beer and sugar, smeared on tree trunks, has long been used by moth collectors as a means of luring these insects. The Oriental Peach Moth in New Jersey is being successfully lured by the products of fermentation. Carbon bi-sulphide has been incorporated in trapping lures for blowflies.

This same principle of attraction by odours is also being applied to the trapping of dingoes, rabbits, etc.

It can be claimed that our local discovery of the attraction of kerosene to the fruit fly has opened up the way to research along these lines against fruit flies. Up to date, very little has been published concerning this method of insect control.

Chemotropism is the reaction to stimuli of a chemical nature perceived through the olfactory sense. Inasmuch as odour is undoubtedly the most important factor in the environment of insects the significance of this tropism is evident. The chief objects of animal or plant life are feeding and reproduction, and in the search for food or for the opposite sexes, chemotropism plays a great part. The sexual chemotropism of the Lepidoptera (Moths) has long been noted as a fact by Entomologists. It is, however, in this more recently discovered chemical stimuli, as affecting the search for food or sex, that we find a method of treatment that I consider has untold possibilities in its practical application.

In the same manner as we have the positive chemotropic reaction we also have the negative chemotropic reaction. This is illustrated in the use of coal tar and other products as repellant odours.

Experiments have already shown that the actions of many insects are directed far more by the antennal sense of smell than that of sight. The sense of smell has been proved to be for certain substances remarkably acute, and the influence of particular smells on the actions of insects at certain

periods of their lives may be of so strong and constant a nature, as to make it difficult to avoid the conclusion, that by playing upon the olfactory susceptibilities of insects, we may obtain over their movements and actions a very large measure of control.

In the course of experiments to discover an odour that would react on the female ceratitis, the following oils were tested in traps. Kerosene, Tar, Rodium, Clove, Whale, Citronella, Insectol, Geraniol, Palmarosa and Javalon oil.

The evidence forthcoming proved that kerosene oil was the only one that had any attraction worth noting and this only upon the males.

The opinion ventured here is that the luring effect of the Kerosene upon the male fly, is due to the smell given off by this oil approximating the sex odour given off by the female fly.

As it was the female flies we desired to destroy, further experiments were made, in the hope that some attractive substance would be discovered.

To this end, fruit juices, sweetened mixtures incorporated with various poisons were tested.

Amongst this group Orange and Rock Melon juices proved to be most attractive, capturing both males and females. This is undoubtedly a food chemotropism or reaction. Continuing the experiments we eventually discovered that Pollard mixed with water had a most marked attraction for the female fly, but exercised little influence over the male. There is apparently contained in pollard some constituent that is responsible for this remarkable reaction.

We have no definite proof that the female flies are attracted to the males by a sex odour. In fact, there is no knowledge that the male insects give off any sex odour. It suggested therefore that the odour emanating from the pollard-borax mixture is not attractive as a sex stimulus or a food, but rather that it excited within the female a desire for oviposition and thereby lures her. In other words it appears to create the desire in the female to unburden herself of her eggs.

In examining many thousands of females so captured we have been fortified in this belief, by the fact that in all instances, the egg sacks were fully laden.

Whatever the explanation of the phenomenon is, the fact remains that kerosene attracts the males, fruit juices attract both sexes in equal numbers and pollard attracts, in the main, females.

We believe that it is possible to discover the particular stimulus which will fit the specialised receptivities of any insect and use it as an effective decoy. There is undoubtedly room for much experimental and research work along this line, both for the Entomologist and Chemist.

Having discovered the attractiveness of pollard, it was decided after our experience with the kerosene oil, to test this formula thoroughly before making any public statement. Tests were carried out over a period of twelve months and proved it to be most effective. The odour emanating from the pollard when mixed with water, seems to be irresistible. Immediately the lure is placed in the traps, the flies can be seen making towards it from all directions. They are so enticed that, after flying to the edge of the vessel, they dive straight into it and are there drowned.

We found that on an average 88 per cent. of the fruit flies captured with pollard lure were fertile females. Many tests with other mixtures and proclaimed lures have been made, but to date, we know of no other that equals it for the capture of this species of fruit fly. It is easily made and is much cheaper than anything else recommended.

Dr. T. B. Ripley, Entomologist to the School of Agriculture, Cedara, Natal, South Africa, states "Your pollard lure is the most effective of all lures tried against Ceratitis in South Africa." Their particular species in Natal is *Ceratitis rosae.*

Tests with the pollard mixture have been made each winter for three years with very convincing results.

Commencing on the 2nd of May, 1926, and continued throughout the winter, spring, and summer to the 3rd week in March, 1927, the final trapping test was made. Four traps were used, two 10oz. lever lid tins and two petrol tins cut to quarter size with marginal edge of one inch. The lure used was composed of 8ozs. pollard, 8ozs. powdered borax, water 1 gallon. The lure was renewed every seven days summer, and every 10 days winter

In the following table is given the total capture in the four traps for each of the 11 months:—

Month.	Males.	Females.	Total.	% Males.	% Females.
May, 1926 ..	896	2,900	3,796	23	77
June	237	2,679	2,916	8	92
July	34	985	1,019	3	97
August ..	2	296	298	.67	99
September ..	—	75	75	—	100
October ..	—	2	2	—	100
November ..	—	—	—	—	—
December ..	10	29	39	25	75
January, 1927	11	50	61	18	82
February ..	60	318	378	15	84
March (3 w'ks only)	62	430	492	12	18
Totals ..	1,312	7,764	9,076	14%	86%

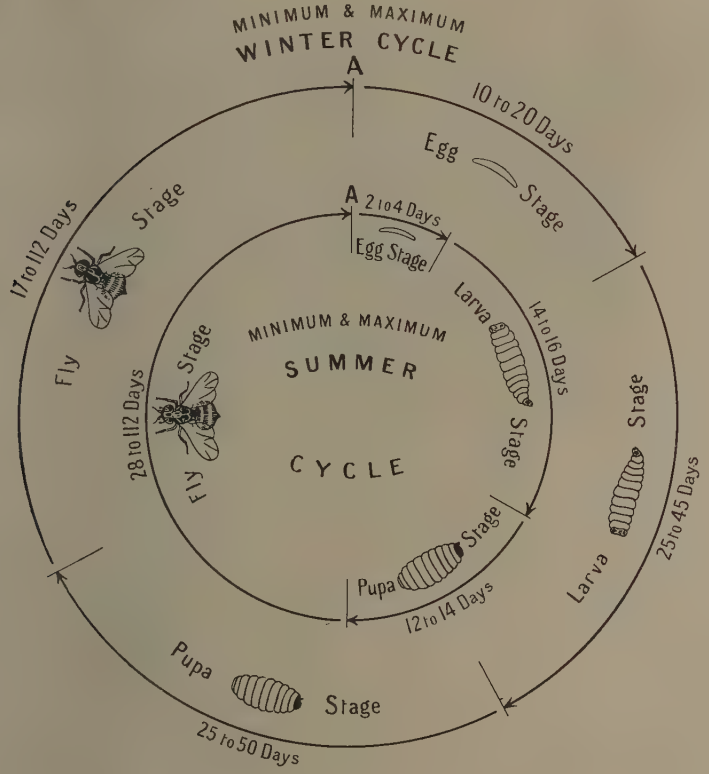
A perusal of this table will disclose a very important fact, namely, the rapid falling away of males as the winter advances. After mid-July, no males were captured until December. It will be also noted that in August the females rapidly get less, being reduced to two in October, nil in November, again appearing in December.

This has happened each year the tests have been made, and we consider goes to prove that the fly is mainly carried over from May to September by overwintering females. These males and females originate from pupae which produced flies in late May or early June before the ground became too cold and wet.

The males naturally die off earlier than the females. The fact of no flies being captured in October and November would suggest that the trapping had been successful in ridding the garden of all the flies present. The capture in December and onwards to the end of the test indicates an influx of flies from outside areas.

These carry-over flies are attracted to the citrus trees which offer good shelter from wet and windy weather. They also are the only trees carrying fruits during winter. The flies feed upon honey-dew, waxy coatings of the fruits, juice of split or damaged fruits.

If weather conditions in winter are sufficiently bright and warm, egg-laying may be stimulated and a few citrus or loquat fruits be struck. These maggots are naturally slow in their development and will issue as early summer flies. This is another slender thread by means of which the pest is carried over: hence the need for destroying these winter flies.



Diagrammatic Life Cycle (original).

In our more recent experiments it has been demonstrated that the addition of arsenate of soda to the pollard lure enhances its usefulness in two ways. It acts as a further corrective against fermentation and also renders the lure poisonous to any flies that may partake of it and escape capture in the trap.

The lure that is now recommended is made of the following ingredients:—Pollard 8ozs.; powdered borax 8ozs.; arsenate of soda ¼oz.; water to make 1 gallon of liquid.

Method of Making.—Mix the ingredients together thoroughly and allow to steep for 14 to 16 hours. At the end of this period again shake well together and allow to settle.

The heavy matter will fall to the bottom of vessel, leaving a fairly clear amber coloured liquid. Draw or syphon off the liquid discarding the residue which should be buried. By using only the clear fluid, the clogging of the traps is prevented. This preparation, if kept corked, will keep for a considerable period.

The lure should be renewed every seven to ten days in summer and every 12 to 14 days in winter.

Type of Traps to Use.—The efficiency of a fly-trap is greatly improved according to its design. In the large series of experiments undertaken it was found that the main use of the lure was to entice the fly to the trap.

It was soon evident that a trap made of a tin having a smooth edge, captured considerably fewer flies than one having a marginal edge, such as the lever lid tins.

This is accounted for by the eagerness of the fly to get to the lure. In the case of the non-marginal-edged tin, the fly after settling on same will crawl down the sides to the lure.

The wind during this act may cause the trap to sway and the liquid to splash up the sides, thus frightening the fly away.

When the marginal-edged tin is used, the fly does not attempt to crawl down the darkened sides.

Being unable to resist the lure the fly dives straight off the edge into the liquid and is there drowned.

The size of the trap is a factor to be considered. There appears to be little advantage in using large vessels. The few extra flies captured will not repay the cost of the increased amount of lure required to fill the large traps.

In general use it will be found that a marginal-edged tin having a capacity for holding about ¾ of a pint is the most economical and effective size. Whatever the size of the trap, it is necessary to three parts fill with the lure.

Therefore the ¾-pint tin will need 10ozs. or ½ pint of lure each filling.

A deep dark trap only half filled will fail to attract the fly, as it refuses to enter unless the surface of the lure is well lighted.

The colour of the trap is another important factor. A rusty tin is not nearly as effective as a bright one. White is more attractive than black.

The position of the traps in the trees is important. Experiments have shown that when placed about half-way up the tree on the North-East and North-West sides, the best results are obtained.

If fruit is present hang in proximity to same.

In summer (November to March) hang in shade. In winter (April to October) hang in sun.

The minimum number of traps for each tree is two. As many more may be used as the grower finds time to attend to.

In small orchards and home gardens the trapping or luring method is the one that will give the best results. Trapping appeals to most people

because it gives great satisfaction to the operator, in that he is able to see and tabulate the capture.

Unfortunately most growers cease to take active measures against the fruit-fly after April. It is here where the great mistake in the efforts to control this pest is made.

After years of observations and trapping experiments it has been proved that the fruit-fly is mainly carried over from summer to summer per medium of over-wintering females.

The figures given in the earlier part of this article clearly demonstrate this fact.

In view of these known facts, it behoves all growers to continue the warfare against this serious fruit scourge throughout the whole year. Trapping or luring should be put into operation whenever the weather condition will permit.

The reduction brought about by the capture of winter and spring flies is proportionately much greater than at a later period when large numbers may be caught, owing to the presence of the insect in plague form.

The important fact to remember is that the flies captured from May to October, although comparatively few in numbers, are the progenitors of the myriads which appear later in the summer.

From May to October is the weak link in the life of this fly under our local climatic conditions.

This is proved by the slight outbreaks which occur here and there in the early summer. As the warm weather comes in, it rapidly assumes, if not controlled, plague form.

In conjunction with the trapping or luring method, it is essential that orchard sanitation be strictly practised. This applies to windfall and infested fruits during all the periods of the year. Infested citrus fruits and loquats, left about the ground during winter, are as great a menace as infested fruits in the warmer periods of the year.

The control of this pest by trapping or luring is possible if all concerned will take concerted action. One neglectful grower in any area may be the means of undoing much of the good work being done by his neighbours.

HORTICULTURAL NOTES.

SEASONAL WORK FOR JULY, AUGUST, AND SEPTEMBER.

GEO. W. WICKENS,
Superintendent of Horticulture.

July.

Growers of apples, pears, and stone fruits will be occupied during this month in pruning and to anyone interested in horticulture, but particularly to those whose livelihood depends upon the quantity and quality of fruit produced, there is no other orchard task throughout the year which is as interesting as pruning. Each year the results of previous year's operations can be noted, past errors corrected as far as possible, and satisfaction felt when the tree is seen to have responded to the treatment given by the skilful operator. I am, of course, referring to pruning which is intelligently performed and where no cut is given without a reason; not to that type of tree disfigurement which sometimes masquerades under the name of pruning, and which mainly comprises indiscriminate cutting back of young growths with an occasional sawing out of a limb; the latter apparently with the idea of imparting a finish to the job.

Anyone who masters the principles underlying the practice of pruning and carefully notes the result of each year's work, will soon become efficient, and not only experience the joy which is always found in work well done, but reap profit as well. Each tree must be treated in such a way that it will produce a maximum quantity of fruit of good quality and marketable size. Leaders must be spaced so as to allow light and air to penetrate freely to every part of the plant, while guarding against over-exposure. In the tree's earlier years care must be taken by moderately hard pruning to force growths from buds along each leader's length and avoid bare spaces so often noticeable, but so unsightly and unprofitable; while in later years equal care must be taken in guarding against overcrowding of bearing buds and shoots which may produce many fruits, few of which are of good quality or marketable size.

Provided the land is not too wet and sticky, July is one of the best months for planting out deciduous trees. Care must be exercised when the young plants are received from the nurseries to carefully heel them in so that the air does not dry the moisture out of the roots. If this is done, the trees will not be injured if planting cannot be proceeded with for a few weeks after the trees arrive.

All growers whose orchards are known by the Department to be infected with San José Scale will have received notice either by registered post or delivered personally, requiring spraying to be carried out once during the winter months, and advising where an orchard is badly infested to spray

twice before 7th September. Failure to comply with these instructions renders a grower liable to prosecution and a minimum fine of £5 with a maximum of £100.

Quite apart, however, from the legal penalty attached to non-compliance with the instructions, the grower who fails to spray is acting very foolishly in his own interests, for with efficient winter spraying San José Scale can be kept down to negligible proportions and will hardly be noticeable on the trees or fruit during summer. It has been noted during this and last year's export season that a distinct improvement has taken place over previous years in the quantity of infested fruit turned back at the ports, and if growers will persevere in their efforts efficient control will be secured.

Continue trapping for fruit fly and destroy all oranges and mandarins found to be infested.

August.

Pruning and planting deciduous trees should be completed by the end of this month, and wherever the soil is dry enough, spring ploughing should be in full swing. The second winter spraying for San José Scale should be completed before the 31st on all trees where the buds are forward. Late blooming kinds, like Rome Beauty and Five Crown apples, may be left until about the 7th of September.

Where old apple and pear trees require working over to other varieties, the necessary scions should be secured early in this month from trees thoroughly dormant, and buried in soil in a cool place to retard bursting of the buds.

Orange Aphis will appear about the end of this month and where the insects are sufficiently numerous to damage the young shoots, they should be sprayed with Black Leaf 40 and soap, using 1 lb. Black Leaf 40 and 3 lbs. soap in 80 gallons of water.

Carefully examine ripening loquats for traces of fruit fly and destroy these with any oranges or mandarins found to be infested.

Continue trapping for fruit flies and examine, cleanse and replenish traps as often as required.

September.

This is one of the busiest months for the fruitgrower. Ploughing, cultivating, hoeing, grafting and spraying are the major operations requiring attention and amongst these, one of primary importance, is attention to Pear Scab (*Venturia pirina*). In orchards where this disease is in evidence, it is imperative that the trees should be sprayed with Bordeaux Mixture—6 lbs. Bluestone, 4 lbs. Lime, 50 gallons of water—during the pinking stage of blossoming; that is when the majority of blooms are showing as a pink bud, and when only a few have burst into petals. If this time of spraying is missed, it is difficult to obtain satisfactory results with a number of later sprayings. In many districts in this State in ordinary seasons, the pinking stage spray is all that is required, but when weather conditions are favourable during spring for the development of fungi, a further spraying becomes necessary after the fruit is formed and this time it is advisable to use Lime Sulphur at a strength of 1 lb. Lime Sulphur in 40 gallons of water owing to

Bordeaux Mixture, if applied at that stage having a tendency to russet the fruit. Lime Sulphur should not be used when the sun is bright and the temperature over 75 deg. Choose cloudy cool days if possible.

Continue treatment for Orange Aphis wherever the pest is sufficiently in evidence to damage young shoots and blossoms.

Trap and bait regularly for fruit fly from now onwards throughout the spring and summer in every orchard in infested districts as soon as the various fruits become sufficiently ripe to serve as a depository for the eggs of the female fly. Pick up every 24 hours and destroy all infested fruit.

Complete planting citrus trees this month. Graft over all obsolete varieties of apple and pear trees with varieties which will pay for their upkeep in the orchard, but only do this if the stocks are sound and healthy; an unthrifty stock will never produce a good tree, no matter how well the grafting is done. Use the strap graft and if not familiar with it, ask the Orchard Inspector in your district for a demonstration.

INFLUENCE OF THE BROOD NEST ON SWARMING.

H. WILLOUGHBY LANCE,
Apiculturist.

Sometimes one comes across a beekeeper who says:—"I never disturb the brood chamber. I have not looked at it for two years."

All beekeepers should remember that the brood chamber is the source of all the riches of the hive, and if there is anything wrong there, it will affect the whole work of the colony.

Many little things may go wrong, but there are three important things which need watching. If, on examination in the spring, when other colonies are breeding well, a hive is found with half its breeding cells empty and only patches of brood here and there, although there is honey and pollen in the hive, it means that the queen is not up to the mark; she is either too old or a poor breeder. The hive needs re-queening. Secondly, the brood chamber may be choked with honey, and out of 10 combs only four or five available for breeding; or thirdly, some of the breeding combs may be so old and the cells so small through constant use for breeding (every larva leaves behind a thin skin and thus the size of the cell is gradually reduced) that the queen will not lay in them. Thus, again, the number of available combs may be reduced to four or five.

Either of these conditions will induce early and perhaps frequent swarming. The remedy would be to remove the full or faulty combs and replace with frames fitted with full sheets of foundation.

If upon examination, say, seven or eight out of 10 frames are found to be available for breeding and pollen storing, this may not be sufficient to prevent swarming.

In the spring a good queen is eager to lay worker eggs and build up a large family, that they may fill the storehouse with food for lean months. There is also the natural law of increase of species to be remembered. At this season a good queen will lay anything from 1,000 eggs per day upwards. Under these circumstances, the hive will soon become overcrowded, both with adult bees and hatching brood, and it may be found that all the available brood combs, even up to eight or nine, may be full and that there is no room for the queen to lay more eggs; under these circumstances, the bees will build queen cells in preparation for swarming.

The bee-keepers' policy should now be to cut out any queen cells and give more room by putting on a second storey. Do not simply put this on top, filled with drawn combs or foundation, but take three or four frames of brood and one of honey and pollen out of the original brood chamber and place in the centre of the second storey. Close up the brood in bottom chamber and place empty combs or frames of foundation between the brood and outside combs of honey, or alternate the new frames with the frames of brood, but do not put all the new frames together in the centre. The queen will now probably use both chambers for breeding.

By this method a strong colony will be built up ready to gather surplus when a honey flow starts. As soon as the two chambers are reasonably full, a third storey of full depth or shallow frames may be added for the storage of the surplus honey, which will be the bee-keeper's toll for the trouble he has taken. In a good season, two or even three spare supers may be required for the surplus.

Swarming will be much delayed, and if the beekeeper will examine the brood chamber every week or ten days and cut out queen cells, with a good strain of bee, swarming may be entirely eliminated.

Warning.—All beekeepers are warned to be very careful when purchasing or putting into use any second-hand material or apparatus.

Only recently foul brood was discovered in the apiary of a bee-keeper of long standing and experience. He had never had foul brood or known of it in the neighbourhood, and puts its introduction down to purchasing second-hand hives and frames from another district.

Anyone putting second-hand material into use should thoroughly disinfect same by boiling for 15 minutes or scorching all over, and particularly into joints, with a painter's or plumber's blow lamp.

If intending to purchase same from a person or district about which he knows nothing, the intending purchaser should communicate with the Agricultural Department before closing the deal, as the Department may be able to give him information that may save the beekeeper considerable loss.

FIELD EXPERIMENTS WITH WHEAT AT THE CHAPMAN EXPERIMENT FARM.

I. THOMAS, Superintendent of Wheat Farms.
P. JEFFREY, Farm Manager.

In addition to the result of experiments which were published in the March issue of the Journal of Agriculture the following experiments were conducted at the Chapman Experiment Farm during 1927.

With wheat:—Mulching Experiment.
Depth of Ploughing Experiment.
Seasonal Planting Experiment.

The following table shows the monthly rainfall recorded at the farm during 1927 together with the averages over the past 22 years:—

—	Jan.	Feb.	Mar.	Apl.	Growing Period. May.	June.	July.	Aug.	Sept.	Oct.	Total.	Nov.	Dec.	Total for Year.
1927	4	10	524	35	261	532	390	277	221	85	1,766	8	94	2,441
Average, 22 years	28	52	49	44	266	428	394	264	170	98	1,580	27	26	1,806

These records show the total rainfall for the year to be 634 points above the average, whilst that for the growing period was 186 in excess of the average. This excess was the reverse of beneficial as some of the land became waterlogged early in the season.

All these experiments were planted on fallowed land which had been ploughed during the winter months of 1926.

MULCHING EXPERIMENT.

The object of this experiment is to determine how far and under what conditions the cultivation of winter fallowed land is profitable during the spring and summer months.

The experiment has been conducted since 1914 and, as in previous years, the following system of cultivation was adopted.

No. 1 Plot was cultivated in spring, after rain in summer and before planting.

No. 2 Plot was cultivated in spring and before planting only.

No. 3 Plot representing neglected fallow was cultivated prior to planting only.

The land on which the experiment was conducted was typical of jam timber country and had been ploughed to a depth of four inches with a mouldboard plough.

At planting time it was noticed that on the neglected fallow plots and also, to a lesser degree, the plots which received the spring and autumn cultivation only, the ground had become set and an even seed bed was not obtained.

The results are as hereunder:—

MULCHING EXPERIMENT.

GRAIN YIELDS.

Variety, "Nabawa." Seed, 45lbs. per acre. Superphosphate 100lbs. Planted 23rd May, 1927.

Treatment.	Computed Yields per Acre.						Percentage, 1927.	Percentage, 1914-27.
	Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.	Average.		
	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	%	%
Cultivated in spring, after summer rains before planting only	20 48	20 0	20 32	20 0	19 4	20 5	143	112
Cultivated in spring and before planting only	15 44	15 28	14 8	12 48	13 36	14 27	100	100
Cultivated before planting only	15 12	14 56	12 16	11 44	10 56	13 1	93	90

HAY YIELDS.

Treatment.	Computed Yields per Acre.				Percentage, 1927.	Percentage, 1914–27.
	Sec. 1.	Sec. 2.	Sec. 3.	Average.		
	C. Q. L.	C. Q. L.	C. Q. L.	C. Q. L.	%	%
Cultivated in spring, after summer rains and before planting	25 1 12	21 1 20	16 0 16	20 3 25	133	108
Cultivated in spring and before planting	19 1 4	15 1 12	12 2 8	15 2 26	100	100
Cultivated before planting only	17 0 8	12 1 4	10 1 4	13 0 24	82	83

The springtyne cultivator was used for all subsequent cultivations and during the fallowing period sheep were depastured at frequent intervals on the whole paddock in which the experiment was conducted. Consequently there was little or no weed growth.

The results obtained this year from this experiment are undoubtedly in favour of the spring and summer cultivated plot. At planting time this plot was in better condition, having a well prepared tilth and an even seed bed, with the result that a better and more even germination was obtained than that on the plots which had not received the same amount of cultivation. To a lesser degree this also applied to the comparison of Plot No. 2 with Plot No. 3.

These results demonstrate the necessity for cultivating the fallowed land after heavy rain during the fallowed period and so preventing it from becoming hard and set and less difficult to obtain the desired seed bed and tilth at planting time.

PLOUGHING EXPERIMENT.

This experiment was conducted on typical jam timber country ploughed in June, 1926, with a mouldboard plough. During the second week in September it was disced to a depth of two or three inches, fallowed a week later by the springtyne cultivator. Owing to vigorous weed growth the land was again disc cultivated about the middle of April and again early in May. Immediately before drilling it was springtyne cultivated, thus securing a good even tilth free from weeds.

The experiment is designed to determine the comparative effects upon resulting crops of ploughing at different depths.

Three different depths of ploughing were utilised for the experiment:—

Plot 1. Four inches representing shallow ploughing.
Plot 2. Six " " medium "
Plot 3. Eight " " deep "

These three plots constituted a section which was repeated to enable five such sections being harvested for grain and three for hay.

The experiment was planted on the 17th May at the rate of 45 lbs. seed with an application of 112 lbs. superphosphate. The results obtained are shown hereunder:—

PLOUGHING EXPERIMENT.

GRAIN.

Variety, "Nabawa."

	Computed Yields per Acre.					Average Yield per acre. 1927.	Percentage, 1927.	Percentage, 1915–27.
	Sec. 1	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.			
	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus lbs.	bus, lbs.	%	%
4ins. ...	17 36	16 56	16 56	16 56	17 44	17 14	99	102
6ins. ...	18 0	16 24	17 12	17 28	17 52	17 23	100	100
8ins. ...	17 52	16 8	16 0	18 16	16 32	16 58	97	104

HAY.

	Computed Yield per Acre.			Average Yield per acre, 1927.	Percentage, 1927.	Percentage, 1915–27.
	Section 1.	Section 2.	Section 3.			
	cwt. qrs. lbs.	cwt. qrs. lbs.	cwt. qrs. lbs.	cwt. qrs. lbs.	%	%
4ins.	15 3 2	16 3 17	19 0 3	17 0 26	98	99
6ins.	17 0 0	16 3 14	19 0 11	17 2 18	100	100
8ins.	15 0 25	16 3 14	19 0 8	17 0 6	97	103

These results, which are almost equal, confirm the conclusion derived from those of previous years, namely that the depth of four inches is sufficient for ploughing this class of country when fallowing. Although no injurious effects appear to result from ploughing jam country to a greater depth than four inches, yet the practice of deep ploughing has not proved itself to be advantageous and is consequently not economical.

SEASONAL PLANTING EXPERIMENT.

The preparation of the land for this experiment was commenced in July and August, 1926, by ploughing to a depth of four inches. During September it was disc cultivated, and the following month Springtyne cultivated to eradicate weed growth. Prior to seeding the land was again disc cultivated and harrowed. The plots planted in May and June received an extra cultivation immediately before being seeded. The result of these operations was the production of a good seed bed and covering tilth.

Three plantings were made, one each April, May and June respectively, the objects being—

April.

(a) To determine whether any variety when planted in April is more prolific than the principal variety, "Nabawa," planted in May;

(b) To determine the variety most suitable for planting in April.

May.

To determine the variety, whether late, midseason, or early, most suitable for the principal planting in May.

June.

(a) To determine whether any variety when planted in June is more prolific than the principal variety, "Nabawa," planted in May;

(b) To determine the variety most suitable for planting in June.

The results of the three plantings are as shown hereunder:—

APRIL PLANTING.

GRAIN YIELDS.

Planted 20th April, 1927. Seed, 45lbs. per acre Superphosphate, 100lbs. per acre.

Date of Planting.	Variety.	Maturity.	Computed Yields per Acre.										Average Yield.	
			Sec. 1.		Sec. 2.		Sec. 3.		Sec. 4.		Sec. 5.			
			bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs
	*Yandilla King	Late ...	8	24	8	16	7	4	7	20	8	24	7	54
May 18th, 1927	Nabawa (Control)	Midseason ...	18	16	14	32	16	16	15	20	11	28	15	11
	Baroota Wonder Early	Late-midseason	13	12	14	8	11	44	12	0	14	24	13	6
	Nabawa ...	Midseason ...	9	4	9	4	8	40	9	4	9	44	9	7
May 18th, 1927	Nabawa (Control)	Midseason ...	18	40	17	4	16	0	13	20	15	12	16	3
	Gallipoli ...	Late-midseason	9	4	8	24	8	56	9	36	12	40	9	44
	Gluyas Early	Early ...	12	40	12	16	10	16	12	48	12	56	12	11
May 18th, 1927	Nabawa (Control)	Midseason ...	16	56	16	32	13	36	12	48	11	28	14	16
	Canberra ...	Early ...	16	56	16	32	15	20	17	12	17	36	16	43

*Affected by rust.

MAY PLANTING.

GRAIN YIELDS.

Planted 20th May, 1927. Seed, 45lbs. per acre. Superphosphate, 100lbs. per acre.

Variety.	Maturity.	Computed Yields per Acre.										Average Yield.	
		Sec. 1.		Sec. 2.		Sec. 3.		Sec. 4.		Sec. 5.			
		bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.
*Yandilla King ...	Late	6	32	5	52	6	0	4	40	4	16	5	28
Nabawa (Contro)	Midseason ...	12	0	12	40	13	28	12	16	12	0	12	29
Baroota Wonder Early	Late midseason	14	56	17	44	18	48	16	56	16	32	16	59
Gallipoli	Late midseason	10	8	12	16	12	48	10	8	10	16	11	7
Nabawa (Control)	Midseason ...	11	20	12	8	10	16	10	56	11	20	11	12
Gresley	Early	15	12	18	48	16	48	15	44	16	48	16	40
Canberra	Early	17	12	20	16	18	0	16	56	19	20	18	21
Nabawa (Control)	Midseason ...	13	4	13	20	12	8	12	24	13	4	12	48
Carrabin	Early	10	8	10	24	11	20	11	36	10	8	10	43
Comeback ...	Early	14	32	16	32	16	24	13	28	14	16	15	2
Nabawa (Control)	Midseason ...	13	12	15	12	13	36	13	28	13	52	13	52
Merredin	Early	15	12	16	16	15	20	14	32	16	8	15	50
S. H. J.	Very Early ...	14	24	16	8	12	48	13	12	13	52	14	5
Nabawa (Control)	Midseason ...	13	4	14	8	12	8	13	28	13	36	13	17
Noongaar	Very Early ...	12	0	12	24	12	0	11	52	11	44	12	0

* Affected by rust.

JUNE PLANTING.

GRAIN YIELDS.

Planted 22nd June, 1927. Seed, 45lbs. per acre. Superphosphate, 100lbs. per acre.

Date of Planting.	Variety.	Maturity.	Computed Yields per Acre.										Average Yield.	
			Sec. 1.		Sec. 2.		Sec. 3.		Sec. 4.		Sec. 5.			
			bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.
May 20th, 1927	Nabawa ...	Midseason ...	12	56	14	40	18	24	18	40	14	8	15	45
	Nabawa (control)	Midseason ...	17	36	22	56	25	4	22	40	18	48	21	25
	Carrabin ...	Early ...	15	20	15	4	17	20	16	8	13	20	15	26
	Gluyas Early	Early ...	16	0	18	40	16	56	16	56	14	56	16	42
May 20th,	Nabawa (Control)	Midseason ...	17	4	25	36	23	4	20	48	19	12	21	9
	Canberra ...	Early ...	13	12	14	40	13	4	13	28	11	20	13	9
	Merredin ...	Early ...	14	56	16	24	12	40	14	24	10	16	13	44
May 20th, 1927	Nabawa (Control)	Midseason ...	19	36	23	28	22	56	19	28	18	0	20	41
	Gresley ...	Early ...	15	12	14	24	12	56	15	44	12	0	14	3
	S. H. J. ...	Very Early ...	16	32	15	12	11	20	17	20	13	12	14	43
	Nabawa (Control)	Midseason ...	23	44	22	8	22	0	22	8	20	8	22	2
	Noongaar ...	Very Early ...	11	12	10	24	10	56	10	16	9	28	10	27

The results of the above experiment, which are for one year only, show no definite indication that the generally accepted advantage gained by planting the later, rather than the earlier maturing varieties in April, and *vice versa* in June, is correct. They, however, do indicate that the month of May is the most suitable month to plant all varieties, and that when necessary to extend the planting season it is better to seed in April rather than in June.

It is well when perusing these results to remember that the past season was not favourable for the development of the disease "Septoria," which would be expected to affect the earlier maturing varieties planted in April.

It is believed that the failure of the late varieties planted in April was due to a large extent to the fact that, owing to their slowness in getting away, the weeds had a chance to get a hold and dominated the situation. This was very evident in the "Yandilla King," "Nabawa" (April) and "Gallipoli," whereas those varieties which got away quickly from the ground, such as "Gluyas Early" and "Canberra," and even the "Baroota Wonder" did not suffer in the same way. This, however, is more a reason for planting later with a better chance of controlling the weeds, than for planting the early varieties early, and trying to choke the weed growth. The "Yandilla King" also suffered considerably from rust, this disease accounting for the very low yields obtained.

The early varieties yielded better than the later ones planted in June, but "Noongaar," a very early variety, was evidently much too quickly maturing for the conditions at this farm.

POTATO FERTILISER TRIALS ON BLACKBOY FLATS AT YOUNG'S SIDING.

G. N. Lowe,
Senior Potato Inspector.

In view of the large acreage of blackboy country in the Southern area of Western Australia, more particularly along the Albany-Denmark line, trials which have been conducted by the Department should prove of general interest. These trials were carried out in 1927 and 1928 on typical blackboy country at Young's Siding. The weather during the 1927 experiment was very wet, and very dry weather prevailed throughout the season of 1928. In spite of the adverse weather conditions and a slight infection of Rhizoctonia an average yield of 6 tons 17 cwt. 2 qrs. was obtained—a satisfactory result, since the trials conducted by the Department were primarily concerned with the suitability of this type of country for potato growing. Further experiments will be carried out by the Department to obtain suggestions for the manuring of this type of country.

Potato Fertiliser Trials on Blackboy Flats at Young's Siding.

The trials were conducted on the property of Mr. E. W. Ovenall, of Young's Siding. The soil was that of typical blackboy country, low lying, wet and sandy. The flats were well drained and thoroughly cultivated. Mr. Ovenall supplied the seed from crops grown in hill country. This seed was from a strain of Delaware potatoes which had been selected very carefully over a period of years, and was planted at the rate of about 10 cwts. per acre. The whole of the fertilisers were applied in the furrows at the time of planting.

Variations in the quantities of phosphoric acid, nitrogen and potash were made by using varying weights of super, sulphate of ammonia and sulphate of potash per acre. These weights were compared against a stan-

POTATO FERTILISER TRIALS ON BLACKBOY FLATS AT YOUNG'S SIDING—JAN.-MAY, 1928.

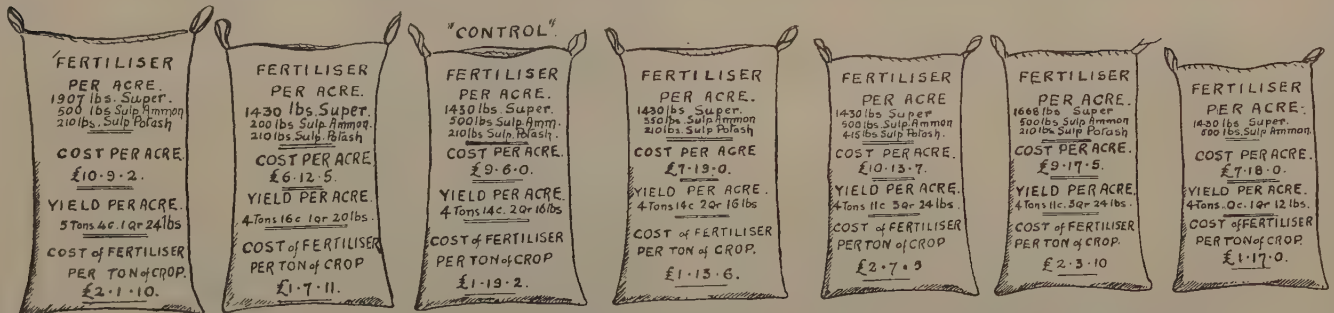


Chart showing Composition and Weight of Application per acre of Fertiliser, the Cost and Computed Yields, and also the Cost of Fertiliser per ton of Crop.

dard control mixture. This standard control mixture, which was used simply as a basis of comparison, was 1,430 lbs. super, 500 lbs. sulphate of ammonia, and 210 lbs. sulphate of potash per acre. It has an analysis of 14 per cent. phosphoric acid, 5 per cent. nitrogen, and 5 per cent. potash, and costs approximately £9 6s. per ton. The variations were made by altering one component only and leaving the rest of the mixture constant.

A reference to the chart of the 1928 trials will show that the highest yield was obtained from a mixture containing 1,907 lbs. super, 500 lbs. sulphate of ammonia, and 210 lbs. sulphate of potash. This mixture gave

The experiment when coming into bloom.

9 cwt. 3 qrs. 8 lbs. per acre more than that of the standard control mixture. If we assume that the price of potatoes is £6 per ton this means an increase of £3 per acre for an expenditure of about 23/-. It was also noticed that there was a much higher percentage of "ware" over that of "small" and "pig" potatoes in the plots with the largest weight of super per acre. Results from the 1927 trials confirmed that an increase of super above 1,430 lbs. per acre is economically sound. Further experiments are necessary to find out how much super can be applied so that the margin of profit derived by the increased manuring is more than the extra cost of the manure. The increased yield derived from the higher application of super may be due to the influence of the phosphoric acid in the super, or to the mechanical effect of the bulk of the manure in the soil. Though a higher yield was obtained by the use of 1,907 lbs. super in the mixture, yet experiments throughout the country have indicated that 1,430 lbs. super is about the right amount for potato growing in Western Australia, but continued experimental work is necessary to determine this, of course.

In the case of the nitrogen series there was no large increase in yield as a result of increasing the weight of sulphate of ammonia from 200 to 500 lbs. per acre. The land used for these experiments was virgin ground, and it is more than probable that as the land is worked a higher rate of manuring with sulphate of ammonia will be necessary. Actually the highest yield in the series was obtained by the lowest weight of sulphate of ammonia, viz., 200 lbs. (See chart.) The difference, however, between the highest and lowest yield was only about 1½ cwt. per acre. A very similar result was obtained in 1927, when the lowest weight of sulphate of ammonia gave the best return. The growing period of the Delaware is so short that it is possible that too much sulphate of ammonia may cause excessive foliation.

It was definitely established that potash is essential in this type of land. The return from the plots treated with a non-potash manure was 11 cwt. 2 qrs. 12 lbs. per acre lower than any other of the plots. On the other hand there was no difference in yield obtained by using 415 lbs. per acre as against 210 lbs.

Summary.

1. Potatoes can be profitably grown on blackboy flats.
2. It would seem that a successful manure for such country is 1,430 lbs. super, 200 lbs. sulphate of ammonia, and 210 lbs. sulphate of potash.

ELEPHANT GRASS.

(*Pennisetum purpureum.* Schum.)

G. K. Baron-Hay and C. A. Gardner.

Description of Plant.

A tall perennial grass with a creeping rhizome, culms erect, in tufts of up to 20, 6 to 10 or more feet in height, branched, terete glabrous, smooth excepting the uppermost internode, which is more or less hairy to tomentose in the upper part. Nodes mostly exserted from the sheaths, all glabrous, or some of them with a ring of stiff long adpressed hairs. Leaf sheaths terete, clasping the stem, striate; ligule a narrow rim bearing a dense fringe of white hairs; blades linear, very long, tapering upwards 1 to 3 feet long, with a strong midrib. Flowers in a dense cylindrical spike from 4 to 12 inches long, usually yellow or tinged with brown, purple, or black-purple, composed of deciduous spikelets or bundles of spikelets, each spikelet or bundle surrounded by an involucre of numerous bristles minutely scabrid and slightly plumose towards the base, unequal, 1.2-2 or up to 4 cms. long. Spikelets sessile, or if in bundles of 2 to 4, the lateral pedicelled, or lanceolate, more or less acuminate, 5-7 mm. long, glabrous, green or straw-coloured, or tinged with brown or purple towards the tips of the florets, rarely dark purple throughout, hermaphrodite or, if fascicled the lateral male, rarely all neuter or all male. Lower glume rudimentary or suppressed, upper ovate to ovate-lanceolate, acute 0.5-1 mm. long, subhyaline. 1-nerved or nerveless. Lower floret male, or more often barren; the glume lanceolate, acute or acuminate, usually as long as the upper floret, more or less distinctly 3-nerved, rarely 1 or 5 or even 7-nerved; palea linear-lanceolate, 2-nerved, shorter than the glume. Upper floret hermaphrodite, or in the lateral spikelets male, flowering glume lanceolate, acuminate, minutely roughened upwards, usually 5-nerved at least in the upper part; palea narrow linear-lanceolate, slightly shorter than the flowering glume, apex minutely 2-toothed. Lodicules 0. Anthers 2.5-3 m.m. long, tips very minutely penicillate. Styles united all along; stigmas very slender, up to 4 m.m. long, exserted from the tip of the floret. Grain obovoid-rhomboidal, yellow, smooth and shining, abruptly tapering into the style.

The species is a native of tropical Africa, where it has a very wide range between 10 degrees N. Lat. and 20 degrees S. Lat. The northern limit runs from Sierra Leone through the great equatorial forest zone to the Cameroons, thence to the Nile, Lake Victoria and British East Africa. The southern limits run through Angola to Katanga, thence across the middle Zambesi to Eastern Rhodesia as far east as Beira. Within this immense area it occurs principally along watercourses and in marshy depressions, but occurs also in the well-lighted forest areas. It often forms reed jungles. In the drier savannahs of East Africa it is rarely more than 6 feet high.

In Western Australia, under drier conditions than in its native habitat, 6-8 feet is considered a good growth.

The grass has been under notice in Africa since 1905, and is considered one of the best fodder grasses there, where it has been tested under severe conditions for some years.

Elephant Grass was probably introduced into Australia in 1914 by the Department of Agriculture, New South Wales, which obtained a parcel of seed in that year. Only one seed germinated, the resulting plant becoming the origin of the grass in that State.

Elephant grass, as far as can be ascertained, was introduced into Western Australia in 1916 by Mr. Alex Crawford, then Chief Inspector of Rabbits, Department of Agriculture, who obtained a small packet of seed from Rhodesia. It is a coincidence that, in this sample of seed also, as in that obtained by the New South Wales Department of Agriculture, only one seed germinated, and from the resulting plant supplies have been distributed over Western Australia.

Several cuttings were grown by Mr. Catton Grasby in 1917, and some idea of the rapidity with which the plant multiplies can be gained from the fact that Mr. Grasby distributed no less than 4,000 cuttings in the spring of 1918, to farmers in various districts of the State.

Elephant Grass at Claremont Hospital for the Insane. One month's growth after cutting, 1928.

Habits.

Elephant Grass (*Pennisetum purpureum*) is a coarse grass when mature, and is characterised by extremely rapid growth under moist and warm conditions. It grows in clumps which stool prolifically, and is thus usually planted in rows from 4-6 feet between plants.

Mature leaves which attain a length of 2-2½ feet are coarse, but, when the plant is grazed or cut, the young shoots, until the plant reaches a height of 3 feet, are soft, succulent and relished by stock.

There appears to have been several distinct strains evolved, differing in such characters as hairiness of leaf and stem, height at maturity, etc.

The common variety has large broad leaves, and flowers at from 7-8 feet. A finer variety, noticed by Mr. W. M. Carne, Botanist and Plant Pathologist, matures at a height of 6 feet and has finer leaves than the common variety. Mr. O. Bowles, Waroona, has 5 acres of this fine variety, which he states gives more rapid growth in the summer months. It is intended to test these two varieties together, for yield, palatability, etc., during the coming summer.

Elephant Grass has not been known to form viable seed in the temperate portions of the State, *i.e.*, South of Geraldton, though in its native habitat seed is commonly produced.

Seed obtained by Mr. P. G. Hampshire, however, and grown by Mr. E. Angelo, M.L.A., Leura Farm, Carnarvon, in 1923, gave a good percentage of germination, namely 47%, which compares favourably with the percentage of germination found in good quality samples of Rhodes Grass seed (40%) and paspalum dilatatum (35%). It would seem possible, therefore, that should seed be required supplies can be drawn from the North-West of this State.

Fine variety grown by F. Coyle, Peel Estate, on light sandy soil. Note flowering heads at height of 4 to 6 feet.

Suitable Climatic Conditions.

Elephant Grass is extremely drought resistant, but, being a heat loving plant, only thrives during the summer months. Those districts, therefore, where no summer rains occur, or where moist ground is not available, are not likely to suit it.

The grass prefers a deep, well drained loamy soil, with plenty of moisture, but has shown itself capable of growing on a variety of poorer sandy soils, under dry conditions.

Where irrigation is possible, excellent results have been obtained on the deep coastal sands as at the Claremont Hospital for Insane (see illustration).

This plant also has demonstrated its ability of growing on the jarrah and she-oak hills found in the extreme South-West, typically from Narrikup to Denmark, including Albany. These hills are of a sandy nature, either lying on solid coffee rock (a form of laterite) or studded with "floating" masses of this rock, on which soils very disappointing results have been obtained with the more common and better class pasture grasses and clovers.

Good results also have been reported on the lighter soils surrounding swamps on the Peel Estate and at Bullsbrook, which retain some moisture during the summer months.

Elephant Grass will not stand hot dry winds, and is, therefore, hardly worth a trial in the Wheat Belt.

Tall coarse variety, grown on sandy loam at Bullsbrook. Photo. taken 18 months after planting, and having been cut three times.

Cultivation.

As seed is difficult to procure, propagation is carried out from roots or cuttings.

Roots or young rooted plants are preferable to cuttings, as growth is more rapid, failure to strike very rare, and a cut can be obtained 10-12 weeks after being first planted, if sufficient moisture is available.

A single plant will produce as many as 40-50 young rooted stems in one season.

Rooted plants may be planted at any time of the year, if the soil is moist, but cuttings should only be planted in the spring.

Cuttings should be taken from the hard portions of the stem, and have three joints. Those taken from the softer upper portions of the stem often rot in the soil.

Rooted plants or cuttings should be planted on cultivated ground which has been ploughed to a depth of 5-7 inches and well cultivated.

Where large areas are to be planted, the cuttings may be dropped in shallow furrows, 3 inches deep, and the earth ploughed back on to them. Small areas may be "dibbled" in, leaving one node (joint) exposed.

Superphosphate at the rate of 2 cwt. per acre should be applied at planting, and a subsequent top dressing with 1 cwt. per acre each spring.

At the Hospital for Insane, it has been found beneficial to thoroughly cultivate the planted area in autumn after feeding off, and again in spring before growth commences.

Elephant Grass on sandy loam at Redmond, near Albany, grown by Mr. J. H. McGoff.

Value as a Fodder Plant.

Where moisture is present, heavy yields of Elephant Grass are obtained, and as many as four cuttings in one season have been secured.

At the Hospital for Insane, Claremont, an average of 3 cuts are obtained, yielding approximately 20 tons in the aggregate per acre. This fodder is held in high esteem by the manager (Mr. J. Kerr) as a factor in milk production during the summer months.

Mr. F. Coyle, Peel Estate, has a small area growing on moist sandy soil, from which he states he obtained four cuttings during the summer of 1926-27.

If not allowed to mature and become fibrous, Elephant Grass is highly relished by stock, particularly cattle and horses. Analyses show that the nutritive value of the grass is high, figures for Sudan Grass and maize are given for comparison.

——	Water.	Crude Protein.	Fat.	Carbo-hydrates.	Indig. Fibre.	Ash.
Elephant Grass (N.S.W.) ...	63·82	3·25	0·41	15·71	14·01	2·80
Sudan Grass	63·9	2·0	1·1	21·5	8·4	3·1
Maize, Green	76·9	1·9	0 6	13·9	5·5	1·2

Little attention has been paid to this valuable fodder plant, but its capacity for thriving on poor soils, such as the sandy jarrah and she-oak hills around Albany, semi-swamp sandy land along the coastal region, as at Bullsbrook, coupled with its undoubted value as a nutritive fodder, renders it worthy of more attention from farmers in the South-West portions of the State.

Explanation of Plate.

A. Habit of plant, half natural size; B. Flowering spike, half natural size; C. Bundle of spikelets taken from base of spike; D. Upper floret, with second glume in front, and lower floret behind; E. Lower floret, with tip of upper floret protruding from behind; F. Dehiscing anther showing pollen; G. Grain.

ELEPHANT GRASS. (Pennisetum purpureum, Schum.) PERTH, W.A. 1928.

PASTRY.

By M. A. Wylie.
Inspectress and Organiser Domestic Science Classes,
Education Department.

Pastry, in savoury dishes, sweets and dessert gives variety, and with care and judicious preparation, may add to the nutritive value of the every-day menu.

There are four varieties of pastry as used by the housewife, viz.—Short, flaky, rough puff and puff, and certain general rules may be applied to each. First and foremost, materials should be of the best quality, the proportions exactly measured: materials and utensils clean and cool and the work done under the coolest conditions possible. Handling should be light and quick, and the oven for baking should be dry, hot and quick.

The difference in types of pastry consists in the varying proportions of fat to flour. This fact will be seen in dealing with the ingredients of the different types. It is essential to remember that self raising flour or rising material should never be used if the exact proportions of flour and fat be adhered to, as the fat, when heated thoroughly produces a gas, which acts as a rising agent. The heating process also breaks, simultaneously, the starch cells of the flour, enabling it to absorb the fat globules as soon as they are liberated through the action of the heat. Thus it will be seen, that if the oven be not hot enough, the pastry is liable to become sodden and indigestible, because the flour is not ready to absorb the fat, which is often seen to escape. Another golden adage to remember, "Use as little water as possible with pastry." When rolling out pastry, use short, even strokes—using but little additional flour, which spoils the required proportion; cut edges lengthwise to allow the heat to penetrate and assist in obtaining lightness. If cooking tarts without fillings, prick well with skewer or fork to prevent puffing in the centre. Custard tarts often present difficulties—as the paste is liable to absorb the custard and become sodden. To obviate this, brush the pastry with white of egg before putting in the custard. The glazing used for pastry for savoury dishes is yolk of egg, or the entire egg well beaten, or milk; for sweet dishes, a glazing mixture of sugar and water is used, or a sprinkling of sugar before serving. Apple pies should not be decorated, except for an edge serrated or crimped; meat pies, on the other hand, may be decorated with fancy designs; Cornish pasties should be raised high and the edges neatly frilled. Closed pies or tartlets require the edges to be slightly damped before joining.

Different Pastries:—*Short Pastry* is used for fruit pies, mince patties, lemon tarts, Cornish pasties, currant rolls, etc., and is made as follows:—

Ingredients:—
½lb. flour.
¼lb. butter, dripping or lard.
Cold water.
Pinch of salt.

Method:—

(1) Sift flour and salt.
(2) Add fat (shortening), and rub in with tips of fingers until resembling bread crumbs.
(3) Add a little cold water and mix to a stiff dough, using a knife.
(4) Turn dough on to board or slab, lightly floured—roll once without folding. Cut into shape. Cut edges like leaves of a book.
(5) Cook in hot oven.

For rich, short pastry, one or two extra ozs. of fat, a yolk of egg, and ½ teaspoonful of lemon juice may be used. This pastry keeps well.

Flaky Pastry is used for sausage rolls, lemon cheese cakes, apple pie, beefsteak pie, etc.

Ingredients:—

½lb. flour.
3ozs. lard.
3ozs. butter.
Pinch of salt.
Very cold water.
½ Teaspoonful of lemon juice.

Method:—

(1) Sift flour and salt.
(2) Add ¼ of the shortening, rubbing in with finger tips.
(3) Add lemon juice and sufficient cold water to mix to stiff dough.
(4) Turn on to a floured board—toss into a ball.
(5) Roll thinly to an oblong.
(6) Spread ¼ of the shortening in small lumps over ⅔ of strip. Sprinkle lightly with flour—fold in three, press edges together—turn top edge to right.
(7) Repeat this process till all shortening is used. Fold and roll twice more.
(8) Cut to required shape.
(9) Glaze and bake in hot oven.

Rough-puff Pastry is often used for sausage rolls, cream horns, oyster patties, etc., instead of flaky or puff paste.

Ingredients:—

½lb. flour.
3ozs. butter.
3ozs. lard.
½ teaspoonful lemon juice.
Cold water.
Pinch of salt.

Method:—

(1) Sift flour and salt.
(2) Cut lard and butter into pieces the size of walnut.
(3) Add to flour without breaking the lumps.
(4) Add lemon juice and sufficient cold water to mix to stiff dough.
(5) Turn on to board or slab, lightly floured.
(6) Roll out very thinly, lengthways.
(7) Fold in three; press edges together to imprison air. Turn top edge to right and roll with short, quick rolls to and from—not from side to side.
(8) Repeat rolling and folding, four or five times.
(9) Cut into shape and bake in hot oven.

Puff Pastry is used for richer varieties of dishes.

Ingredients:—

½lb. of flour.
½lb. butter (very firm).
Yolk of egg.
Teaspoonful of lemon juice.
Very cold water.

Method:—

(1) Sift flour (twice).
(2) Make stiff paste without butter, stirring in yolk of egg, lemon juice and water. Knead till smooth.
(3) Roll out into an oblong—slightly flattened.
(4) Prepare butter with two butter pats, squeezing out any water, into one solid oblong pat.
(5) Place in centre of paste—fold paste over into three.
(6) Press edges together.
(7) Turn half way round, top to right hand side—make 3 dents with rolling pin, groove fashion—roll out lengthways as thinly and evenly as possible.
(8) Fold in three, bringing top edge downwards, and bottom edge up.
(9) Press edges together (as in rough puff).
(10) Repeat folding, rolling and turning six or seven times.
(11) Between 3rd and 4th rolling and 5th and 6th rolling, the pastry is improved by allowing it to rest on slab in ice chest if possible, for 20 minutes.

Note: Care should be taken during the folding to enclose as much air as possible. This is done by placing the hand in between the layers before pressing edges. Avoid breaking any air bubbles.

N.B.—All pastry is improved by being allowed to remain in a cool spot before baking. It pays to let Puff Pastry remain over night. This, of course, applies to pastry only before fillings, etc., are used.

The meat for meat pies, if cooked before, must be either very cold, or very hot when covered with the pastry. This is also applicable to fruit for fruit pies.

LIVE STOCK AND MEAT.

For the information of readers of the "Journal," the following particulars have been supplied by Messrs. Elder, Smith & Co., Limited, Perth:—

COMPARATIVE YARDINGS OF STOCK YARDED AT METROPOLITAN FAT STOCK MARKETS FOR MONTHS OF MARCH, APRIL, AND MAY, 1928.

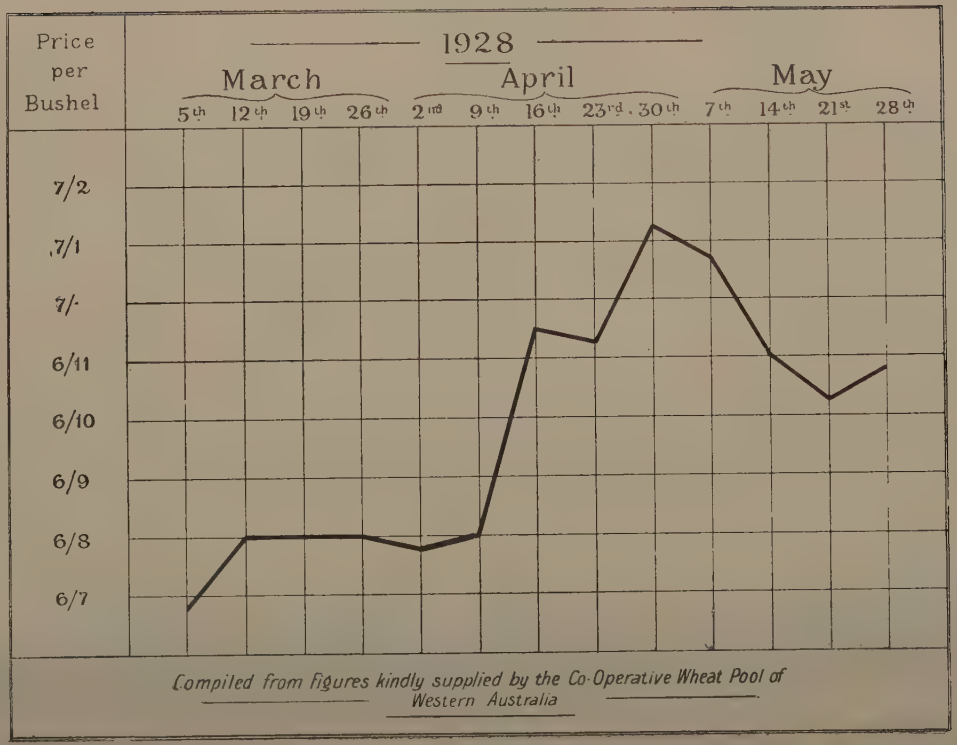
—	MARCH, 1928.				APRIL, 1928.				MAY, 1928.				
	7.	14.	21.	28.	4.	11.	18.	24.	2.	9.	16.	23.	30.
Sheep & Lambs	8,544	8,261	11,150	11,221	7,709	6,597	7,790	8,687	11,691	9,610	9,833	11,458	9,262
Cattle ...	802	586	604	643	671	581	756	691	887	549	909	704	792
Pigs ...	970	720	939	781	920	540	692	470	929	1,004	796	745	552

COMPARATIVE VALUES PER LB. OF STOCK SOLD AT METROPOLITAN FAT STOCK MARKETS DURING THE MONTHS OF MARCH, APRIL, AND MAY, 1928.

—	MARCH, 1928.				APRIL, 1928.				MAY, 1928.				
	7.	14.	21.	28.	4.	11.	18.	25.	2.	9.	16.	23.	30.
Mutton	7½	8½	8	7½	8½	9	9½	10	11	10½	10½	10	10½
Beef ...	6	6½	8	8½	8½	7½	6½	6½	7	8	7½	7½	7½
Pork ...	11½	11¾	11½	11½	11¾	11¾	12	12	11¾	11¾	11¾	12	11¾
Bacon ...	9½	9½	8½	9½	9½	9½	9½	9½	9½	9½	9½	9½	9½

RETURN OF WHEAT PRICES PER BUSHEL

C.I.F & E LONDON



Compiled from figures kindly supplied by the Co-Operative Wheat Pool of Western Australia

MARKET REPORT.

The following particulars of the approximate quantity of chaff available for auction at the metropolitan chaff and grain sales held in Perth during the months of March, April, and May, also the minimum and maximum prices ruling for f.a.q. to prime wheaten, have been supplied by Messrs H. J. Wigmore & Co., Ltd., of Wellington Street, Perth:—

March—Quantity—1,500 tons.
Maximum price—£5 5s. per ton.
Minimum price—£5 per ton.

April—Quantity—800 tons.
Maximum price—£5 12s. 6d. per ton.
Minimum price—£5 5s. per ton.

May—Quantity—1,000 tons.
Maximum price—£6 per ton.
Minimum price—£5 10s. per ton.

It will be seen from the above that good supplies were coming forward in March, and with little incentive for buyers to purchase more than their normal requirements, the market was very dull. However, towards the end of April, owing to the absence of rain, buyers were more inclined to operate, and with rather light yardings available, the market gradually firmed. Beneficial rains have now fallen, and should the season progress satisfactorily, better prices cannot be hoped for, and farmers having a surplus to market would be well advised to steadily consign.

Oaten Chaff.—A noticeable feature of this market has been the extreme scarcity of supplies arriving on the market, and right throughout the period under review, oaten chaff of good qualty has realised prices equal to best wheaten, in fact prime green samples have been worth as much as 5s. per ton more than prime wheaten.

Oats.—During March the market for good heavy feeds remained steady at from 3s. to 3s. 3d. per bushel, but in April and May, owing chiefly to the dry spell, large quantities were used for sheep feeding, and growers generally did not feel inclined to market their surplus. Values consequently firmed, good heavy feed samples, suitable for grading, selling in May as high as 4s. 6d. per bushel. Since the rains have fallen, growers are more inclined to market, and an easier feeling prevails. Nevertheless, there is a fair inquiry for good heavy feeds at from 4s. to 4s. 2d., mediums 3s. 8d. to 3s. 9d.

Wheat.—The market is steady, f.a.q. selling at auction at from 5s. 9d. to 5s. 10d. per bushel, inferior being in demand at lower prices according to sample. Farmers would be well advised to consign their surplus seed to auction, a good market being assured.

METEOROLOGICAL INFORMATION.

STATIONS.	TEMPERATURE.				RAINFALL.		TEMPERATURE.				RAINFALL.		TEMPERATURE.				RAINFALL.	
	Maximum.		Minimum.		For Month.	Average.	Maximum.		Minimum.		For Month.	Average.	Maximum.		Minimum.		For Month.	Average.
	Mean.	Highest.	Mean.	Lowest.			Mean.	Highest.	Mean.	Lowest.			Mean.	Highest.	Mean.	Lowest.		
	MARCH, 1928.						APRIL, 1928.						MAY, 1928.					
					inches.	inches.					inches.	inches.					inches.	inches.
Chapman Farm State	86·7	101·0	60·8	44·1	·49	·52	82·9	101·0	57·0	48·3	·35	·46	75·5	94·8	51·3	40·1	3 15	2·27
Geraldton	81·8	98·8	64·6	52·4	·49	·46	78·8	97·0	60·0	51·2	·50	·84	75·4	90·8	56·5	39·0	2·91	2·79
Walebing	84·5	102·4	57·3	47·8	·29	·77	80·5	100·0	51·9	42·8	·35	·80	72·1	93·0	47·1	30·1	1·97	2·52
Perth	79·8	98·5	59·8	52·3	·10	·81	76·9	95·9	57·4	48·4	·89	1·65	71·1	89·0	51·9	41·0	5·08	4·97
Kalamunda	81·2	98·3	58·8	48·0	·14	·94	77·3	96·0	56·5	48·1	1·06	1·98	69·9	90·8	52·5	43·0	4·85	5·95
Bunbury	76·7	92·2	56·2	48·0	·23	1·04	72·5	89·2	52·8	46·0	1·18	1·75	67·6	79·9	49·4	37·0	5·01	5·31
Bridgetown	82·3	95·0	51·2	41·0	·17	1·06	73·9	95·0	47·5	34·5	2·67	1·67	67·8	82·5	39·8	32·0	3·96	4·56
Albany	71·9	92·4	57·3	46·0	·41	1·58	70·1	94·6	56·0	48·4	4·00	2·71	66·0	82·6	49·8	39·0	5·58	5·03
Merredin State Farm	83·0	98·2	58·4	45·6	1·01	1·01	78·5	97·0	52·3	42·4	·58	·77	68·9	86·0	45·5	32·0	.76	1·25
Northam	85·4	100·5	57·7	48·6	·38	·74	81·3	99·0	52·0	41·0	·28	·81	...	Not	received.	...	2·09	2·20
York	85·1	101·0	57·1	43·0	·19	·66	80·1	98·2	50·6	38·8	·36	·83	71·6	91·0	42·4	32·0	1·50	2·32
Narrogin State Farm	81·9	93·8	53·0	44·5	·20	·82	76·8	94·2	50·7	41·1	1·64	1·07	67·0	83·6	44·5	30·0	2·86	2·76
Katanning	80·2	90·6	54·6	43·3	·01	1·00	74·5	93·7	51·2	39·0	1·94	1·17	66·4	83·2	43·8	34·0	1·89	2·28
Cape Leeuwin ...	72·5	85·0	61·5	54·0	·46	1·29	69·8	92·0	60·3	52·0	3·39	2·11	66·9	77·2	56·0	41·5	5·33	5·64

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This publication contains valuable information dealing with all commercial fruits grown in Western Australia, including advice on planting, pruning, packing, manuring, fruit-drying, wine-making, insect and fungoid pests and their treatment, etc., and the whole forms a text book which every fruitgrower, whether large or small, should have in his possession. The price originally was 8s. 6d., but to allow of distribution being as wide as possible it has been reduced to 2s.

The Pruning of Fruit Trees, by J. F. Moody, Fruit Industries Commissioner:

This publication contains numerous illustrations, being reproduction of photographs taken in this State, of pruned and unpruned trees, which make the details set out in the letterpress particularly easy to understand. Price 2s. 6d.

Fruit Packing and the Marketing and Exporting of Fruit, by J. F. Moody, Fruit Industries Commissioner, and J. Ramage, Packing Instructor:

This publication contains invaluable information on packing and grading fruit for local and export markets. It is freely illustrated, and no fruit-packing shed should be without a copy. Price 1s. 6d.

The Poultry Keepers' Manual, by George Allman, Government Poultry Expert:

This is a most useful and valuable book, not only for beginners, but to all those who keep fowls for pleasure and profit. It deals fully with all matters connected with the industry, including Breeding, Feeding (for stock birds or egg production), Incubating, Brooding and care of chicks, Marketing (eggs and poultry), and all matters of use to the poultry-keeper. It also fully describes symptons of various ailments and diseases and simple treatment for same, and, as the book was written to suit *local conditions,* every poultry-keeper should have a copy by him. Price, 1s.

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A Course of Instruction will be held for Women at the Muresk Agricultural College from July 31 to August 8 inclusive.

Full particulars of the above Courses may be obtained from, and application for admission made to

THE PRINCIPAL,
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Applications will close on July 7, 1928.